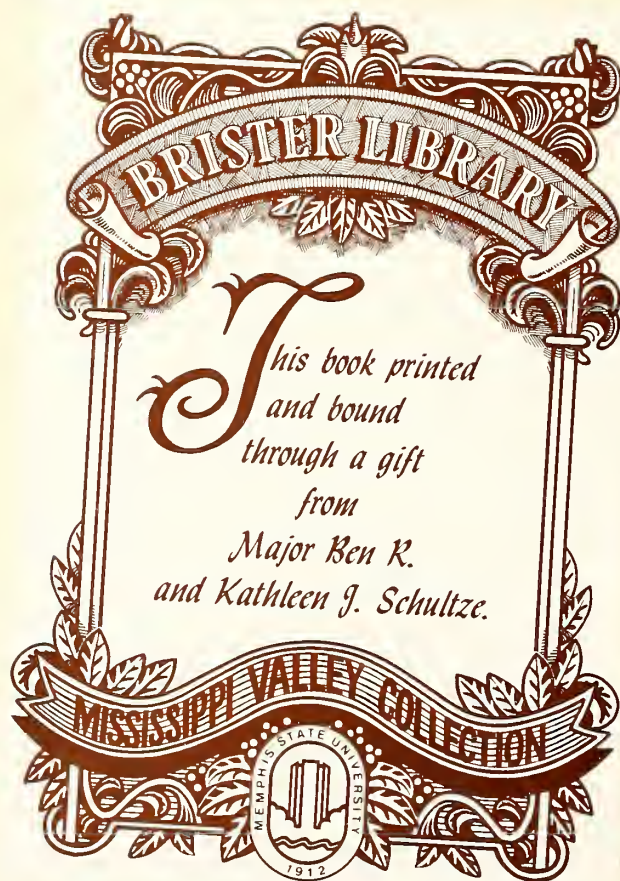


ORAL HISTORY OF THE
TENNESSEE VALLEY AUTHORITY
INTERVIEWS WITH
HARRY WIERSEMA

BY CHARLES W. CRAWFORD
ORAL HISTORY RESEARCH OFFICE
MEMPHIS STATE UNIVERSITY



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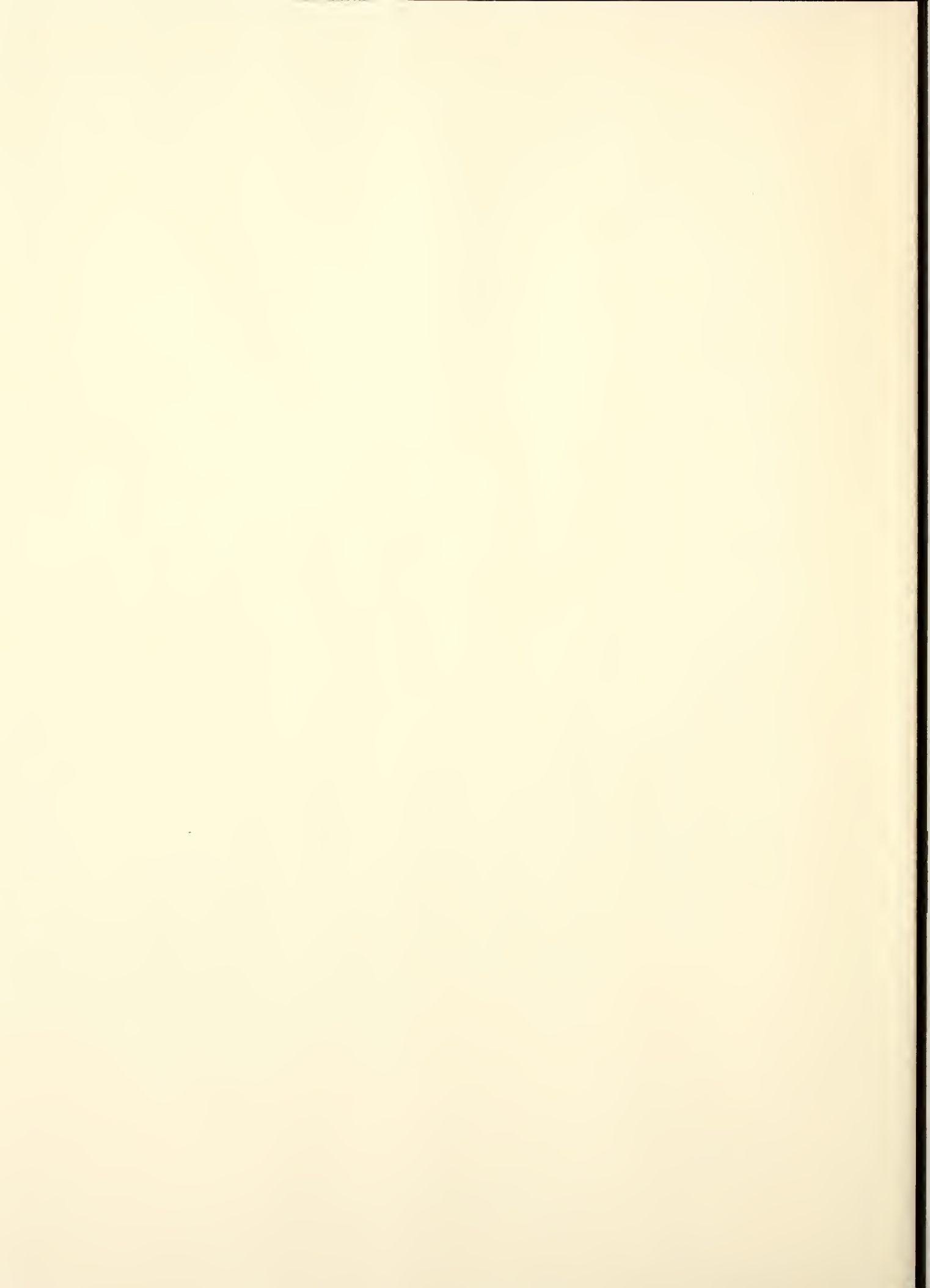
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ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY

INTERVIEW WITH HARRY WIERSEMA

SEPTEMBER 24, 1969

BY CHARLES W. CRAWFORD

ORAL HISTORY RESEARCH OFFICE

MEMPHIS STATE UNIVERSITY



MEMPHIS STATE UNIVERSITY
ORAL HISTORY RESEARCH OFFICE

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PLACE Marshall Town

DATE Sep 24 1969

Harry Wiersema
(Interviewee)

Charles W. Crawford
(For the Mississippi Valley Archives
of the John Willard Brister Library
of Memphis State University)

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THIS IS MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE PROJECT CONCERNING THE ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY. THE DATE IS SEPTEMBER 24, 1969, AND THE PLACE IS KNOXVILLE, TENNESSEE, AT THE APARTMENT OF MR. HARRY WIERSEMA, FORMERLY WITH TVA, PRESENTLY RETIRED AND LIVING IN KNOXVILLE. THE INTERVIEWER IS DR. CHARLES CRAWFORD.

DR. CRAWFORD: Mr. Wiersema, I believe a good place to start would be with background, before you went to work with TVA. Could you tell us, in whatever detail you care to, something about the circumstances of your early life, your education, how you happened to get into the profession you did, and then how you happened to enter TVA. I believe you were born in Madison, Wisconsin.

MR. WIERSEMA: No, Grand Rapids, Michigan in 1892. I was raised in Chicago after about the age of six. I went to the University of Illinois in Champaign, where I studied architectural engineering. I got my degree in 1913. After my graduation I went down to Memphis to work on the Harahan Bridge. I started at the beginning at one of the lowest positions on the bridge and ended up in charge of the construction of the bridge in about three or four years.

I continued in bridge engineering in St. Louis. Then when the war came on I went to the Norfolk Navy Yard in Portsmouth, Virginia. When the war was over I returned to Memphis and went to work for the Morgan Engineering Company, designing bridges, and worked up with the Morgan Engineering Company as a bridge designer until I became secretary of the company and supervisor of engineers on all of their construction work. In the meantime I got a degree from the University of Illinois in professional engineering, and civil engineering, as my work was more in the line of civil engineering than it was in architectural.

MR. WIERSEMA: In 1933, while with the (Arthur) Morgan Engineering Company, I (Cont'd.)

received a call from Dr. Morgan, who at that time was Chairman of the TVA, asking me to come over to Knoxville to do some consulting work on the Norris Dam which was then under study. I came over expecting to stay about two weeks. Dr. Morgan assigned me the task of determining the economic height of the Norris Dam, which had been proposed by the Army engineers to reach a crest of ten hundred and sixty feet above sea level. I studied it intensively for two weeks, staying at the hotel because I had no office with TVA at this time. At the end of that time I became convinced that the dam was designed enginerely too high and the reservoir would never fill with water in one hundred or two hundred years.

Dr. Morgan called me into a meeting and asked me for my opinion, and I stated that I felt that about ten-twenty or ten-twenty-five would be as high as would be economically feasible. At that meeting it was determined that the crest would be ten-twenty. Dr. Morgan asked me to stay for a few weeks and write up my notes, which led to this conclusion. Then he asked me to stay for some other work that he had in mind, and as a result I had brought my family over and stayed with them for some thirty years. Is that enough for this part?

DR. CRAWFORD: Yes. I'll ask a few questions now, if I may. How did you happen to go to Memphis after your graduation, Mr. Wiersema?

MR. WIERSEMA: There was a Chicago engineer, Ralph Modjeski, who had an opening. I applied for the opening, and he sent me down to Memphis to work on that bridge. In my work at the University of Illinois in architectural engineering I had the background for the structural works called for in that opening. I like to travel, and Memphis seemed like a good opportunity for me.



DR. CRAWFORD: What were your impressions of the city when you arrived, Mr. Wiersema?

MR. WIERSEMA: Memphis was a strange city to me, especially the race situation.

I remember walking down the Main Street in Memphis and having a colored man approach me, tip his hat, and step off into the curb. The whole thing was a mystery to me. I had never seen anything like the race situation as it was in Memphis. It was a very beautiful city. The people in Memphis are extremely friendly. I made friends immediately. Although I was working pretty hard on the bridge, I did make many friends in Memphis and finally married there after a few years in Memphis following my experience with the Navy Yard.

DR. CRAWFORD: What year did you go there?

MR. WIERSEMA: I went there in 1914. I graduated in 1913, and I spent my first six months after graduation in Canada, then went down to Memphis in early 1914.

DR. CRAWFORD: What did you do in Canada, Mr. Wiersema?

MR. WIERSEMA: I was working on some grain elevators there at Port Arthur in the province of Quebec.

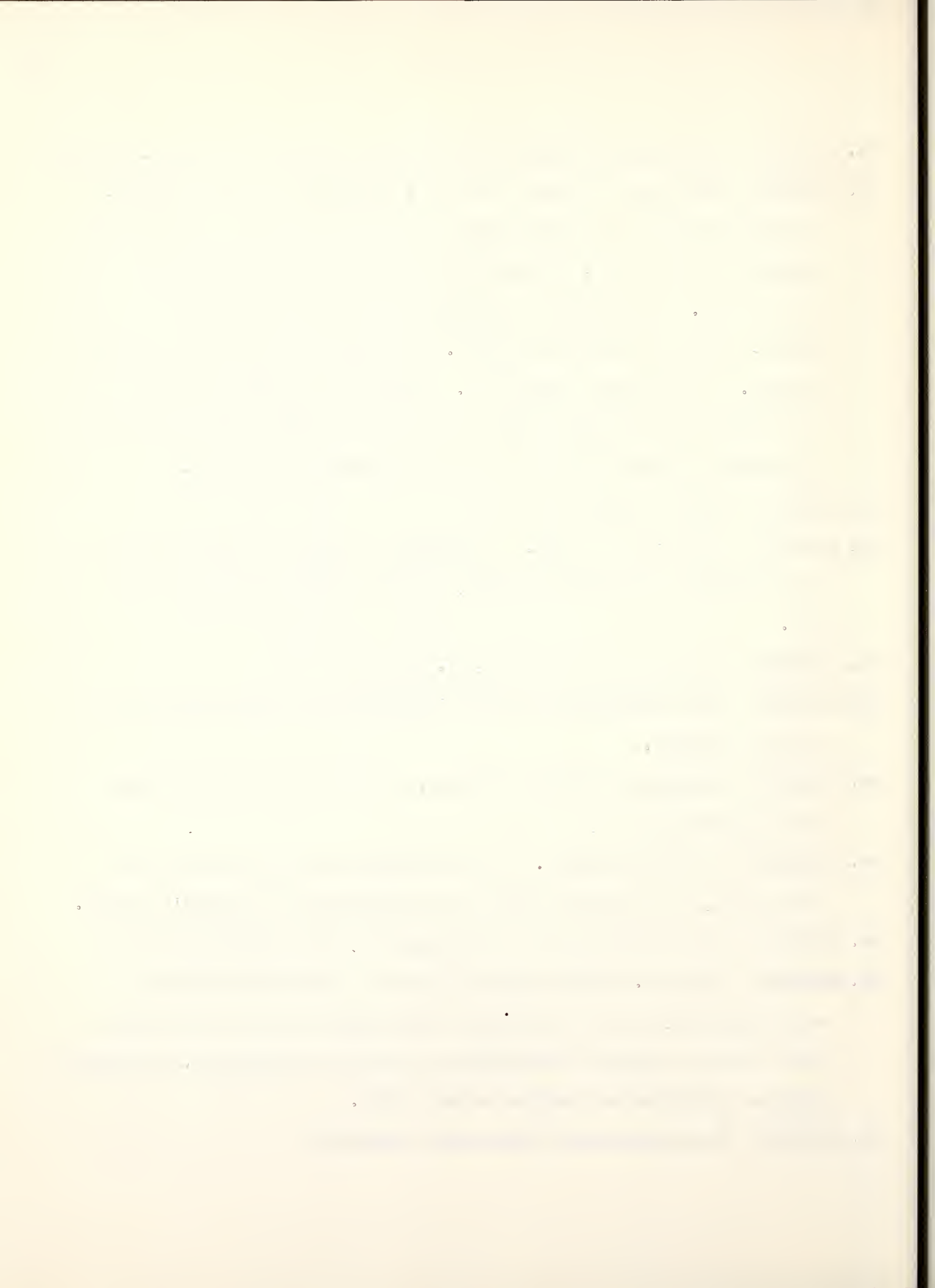
DR. CRAWFORD: And when you arrived in Memphis, was the Harahan Bridge already under construction?

MR. WIERSEMA: It had just started. One of the five piers had just started on caisson work, so I got there almost at the beginning of the bridge's history.

DR. CRAWFORD: Do you feel that was a good background, good experience for you?

MR. WIERSEMA: Very good. Bridge engineering involves almost every kind of engineering work, such as surveying, we had pneumatic pressure work there, river control, structural construction--all phases of engineering. Railroads, highways, everything was involved in that bridge.

DR. CRAWFORD: What year was the Harahan Bridge completed?



MR. WIERSEMA: 1916 or '17.

DR. CRAWFORD: And what was your work on it at that time?

MR. WIERSEMA: As I said, at the beginning I was one of the minor surveyors. At the end I was in charge of all construction.

DR. CRAWFORD: Did you go to the Morgan Engineering Company before or after the war?

MR. WIERSEMA: After the war.

DR. CRAWFORD: And what was the nature of your experience during World War I?

MR. WIERSEMA: At the Norfolk Navy Yard at Portsmouth, Virginia, I was under Admiral Harris, supervisor of construction over a very large program--about sixteen million dollars worth of dry docks, shops, power plants,--everything in connection with the expansion of the Navy to take care of construction during the war years.

DR. CRAWFORD: Why did you decide to go back to Memphis?

MR. WIERSEMA: I was not very interested in the Navy Yard as such. I was interested in construction. The war ended and construction stopped, and there was no real interest in the Navy Yard. I was asked to stay on. I returned to Memphis because I had many friends there and knew of the Morgan Engineering Company. I did return to Chicago first and got a job with a structural engineering firm there, but I saw how confused and busy Chicago is, and I was yearning to go back to Memphis, which I really liked.

DR. CRAWFORD: Did you know Arthur Morgan, or did you know other of the officers of the Morgan Engineering Company at that time?

MR. WIERSEMA: Yes, I had met Arthur Morgan when I first went down to Memphis because he preached in the Unitarian Church, and I was a Unitarian, more or less. I admired his preaching, and got to know some of the men in his company.

MR. WIERSEMA: I knew a half a dozen. One of my best friends, Mr. Fry, was with (Cont'd.)
the Morgan Engineering Company at that time. I think that it probably
was through Mr. Fry that I got interested in going with the Morgan Engineering
Company.

DR. CRAWFORD: Where is Mr. Fry now?

MR. WIERSEMA: He's living in Knoxville, and he is retired, also.

DR. CRAWFORD: He's on our interview list, and I hope to get to him possibly
next month. I didn't remember his address. Do you see him often?

MR. WIERSEMA: I see him, oh, once a week or so, I guess. We belong to the same
technical societies.

DR. CRAWFORD: How large was the Morgan Engineering Company at the time you
joined?

MR. WIERSEMA: When I joined it had, perhaps, twenty-five employees. That is all
of the engineers. At its peak it had about one hundred employees.

DR. CRAWFORD: When was that?

MR. WIERSEMA: It peaked about 1929, I would say--just before the depression.
We did work all over the South. We did work in Texas, Arkansas, Mississippi,
Louisiana--the complete South.

DR. CRAWFORD: Did Arthur Morgan remain President after he went to Dayton, or
did someone else take over the presidency?

MR. WIERSEMA: Mr. Hidingier was the president of the Memphis branch, and Mr. Morgan
became president of the Dayton Morgan Engineering Company.

DR. CRAWFORD: And each was vice-president of the other branch. Is that correct?

MR. WIERSEMA: Correct.

DR. CRAWFORD: What sort of work did you do through the 1920's in engineering?

MR. WIERSEMA: Well, first I became a bridge engineer with Mr. Morgan. I designed their bridges on highways. From that I went into other structural design--levies and conduits. Then I became more or less, administrative officer, managing the office, made secretary of the company and supervised the construction work all over the different projects that we had.

DR. CRAWFORD: In what states did you do this work?

MR. WIERSEMA: As I said, in Texas, Arkansas, Mississippi, Louisiana, Tennessee, of course, I guess that's just about it.

DR. CRAWFORD: Was the work from the Memphis office done altogether in the South?

MR. WIERSEMA: Yes, we had a division with the Dayton Morgan Engineering Company, and they did all the work in the North and we did the Southern work. Once in a while we interchanged and did the northern and western work. I know that we did some work on the Pueblo project.

DR. CRAWFORD: Did you do all sorts of engineering jobs?

MR. WIERSEMA: Mostly hydraulics, such as drainage, levees, flood protection, highways, some little power, but not very much.

DR. CRAWFORD: Did you have engineers who were different types of specialists?

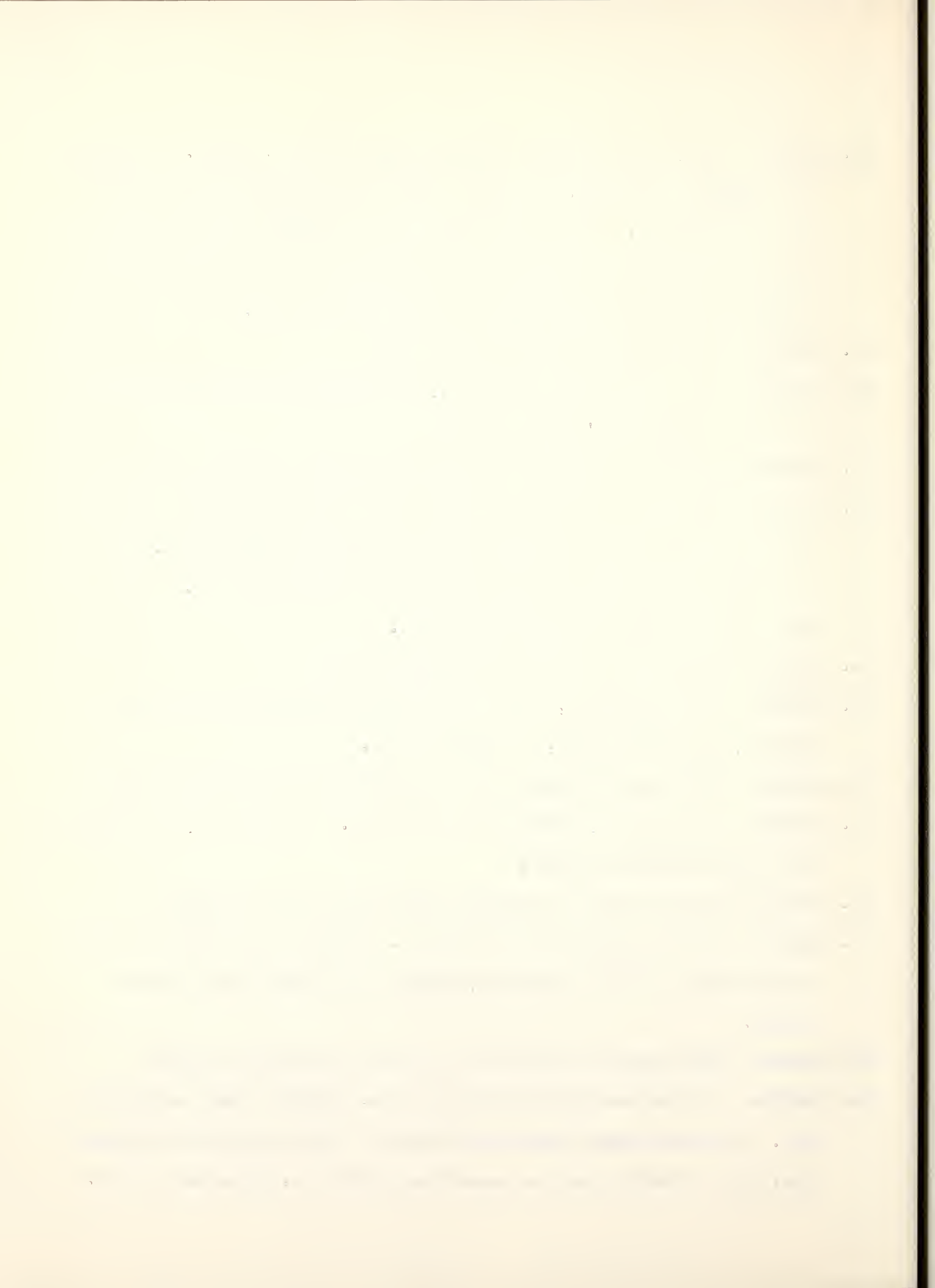
MR. WIERSEMA: Yes, we did do different kinds of jobs. I came as a bridge specialist, but I became broader afterward.

DR. CRAWFORD: Was the company a financial success until the depression?

MR. WIERSEMA: Until the depression very much so. During the depression we had to lay off almost all of our engineers, because work dropped down to almost nothing.

DR. CRAWFORD: What eventually happened to the Morgan Engineering Company?

MR. WIERSEMA: It dissolved after the president, Mr. Hiding, died, perhaps, in 1940. The Dayton Morgan Engineering Company, I think, stayed for a few years more, but it finally phased out several years after Dr. Morgan went to TVA.



DR. CRAWFORD: Was your position, secretary?

MR. WIERSEMA: Yes, of the Memphis Morgan Engineering Company.

DR. CRAWFORD: And that was what you were doing when you. . .

MR. WIERSEMA: . . .came over to TVA, to Knoxville in 1933.

DR. CRAWFORD: Were you familiar with the Knoxville area before?

MR. WIERSEMA: Only superficially. I had passed through Knoxville two or three times, but not to work here for anything, no.

DR. CRAWFORD: What were your first impressions of TVA, Mr. Wiersema?

MR. WIERSEMA: My first impression of TVA was that it was going to be a very difficult project on account of public relations. The power companies immediately started criticizing us, and I really felt that it wouldn't last more than a year or two, as a matter of fact. That's why I rather hesitated to come on over, because I was still employed in Memphis.

DR. CRAWFORD: Was your first real contact with it, then, your consultation work on the Norris Dam?

MR. WIERSEMA: Right. That was my first two or three weeks of work with it. It was just on Norris Dam alone, and it was highly concentrated work.

DR. CRAWFORD: Do you remember when you came to Knoxville to do that work?

MR. WIERSEMA: It was in the fall of '33. I would say September of '33.

DR. CRAWFORD: When did construction of Norris Dam get underway?

MR. WIERSEMA: It got underway almost at once. When I came here, why, we were surveying the site itself and ordering equipment and ordering materials. Soon after I came we asked the Bureau of Reclamation to do the design work, because we had no design organization. I was rather the liaison man between Denver and the TVA here in Knoxville. We used to call them up frequently to ask for drawings for different parts of the construction.

DR. CRAWFORD: How long did you depend on them?

MR. WIERSEMA: I believe for Norris and Wheeler Dams. Yes, I believe for two dams we depended on the Bureau of Reclamation for design.

DR. CRAWFORD: When was Wheeler started?

MR. WIERSEMA: In December of 1933. All of this was started immediately, you see, after we got to Norris.

DR. CRAWFORD: Did you work with Roland Wank?

MR. WIERSEMA: Yes, I did. He was our chief architect, I believe. He was a very good friend, and he lived near me in Knoxville.

DR. CRAWFORD: How did your work fit together in the dam construction?

MR. WIERSEMA: We used to consult with Roland about different features of a design, the gates, the things of that kind.

DR. CRAWFORD: What do you think that he contributed to the TVA architecture?

MR. WIERSEMA: I suppose he made a considerable contribution. He didn't stay so very long. But he did have ideas about the town of Norris and housing and things of that kind.

DR. CRAWFORD: What did you have to do with the town of Norris? Did you do any' engineering work there?

MR. WIERSEMA: Very little. Only in a supervisory capacity. I immediately became interested in the administration, and I was in what they called the Engineering Service Division. We serviced all of the different construction work. We did all the surveys for all construction, we did the preliminary survey work for highways and access roads and things of that kind.

DR. CRAWFORD: Was there a great deal of engineering work, then?

MR. WIERSEMA: Oh, the engineering work was stupendous. We couldn't get engineers enough. We used to work until two o'clock in the morning, sometimes, trying to get work out. It was really fantastic.

DR. CRAWFORD: Why were you unable to hire all the engineers that you needed?

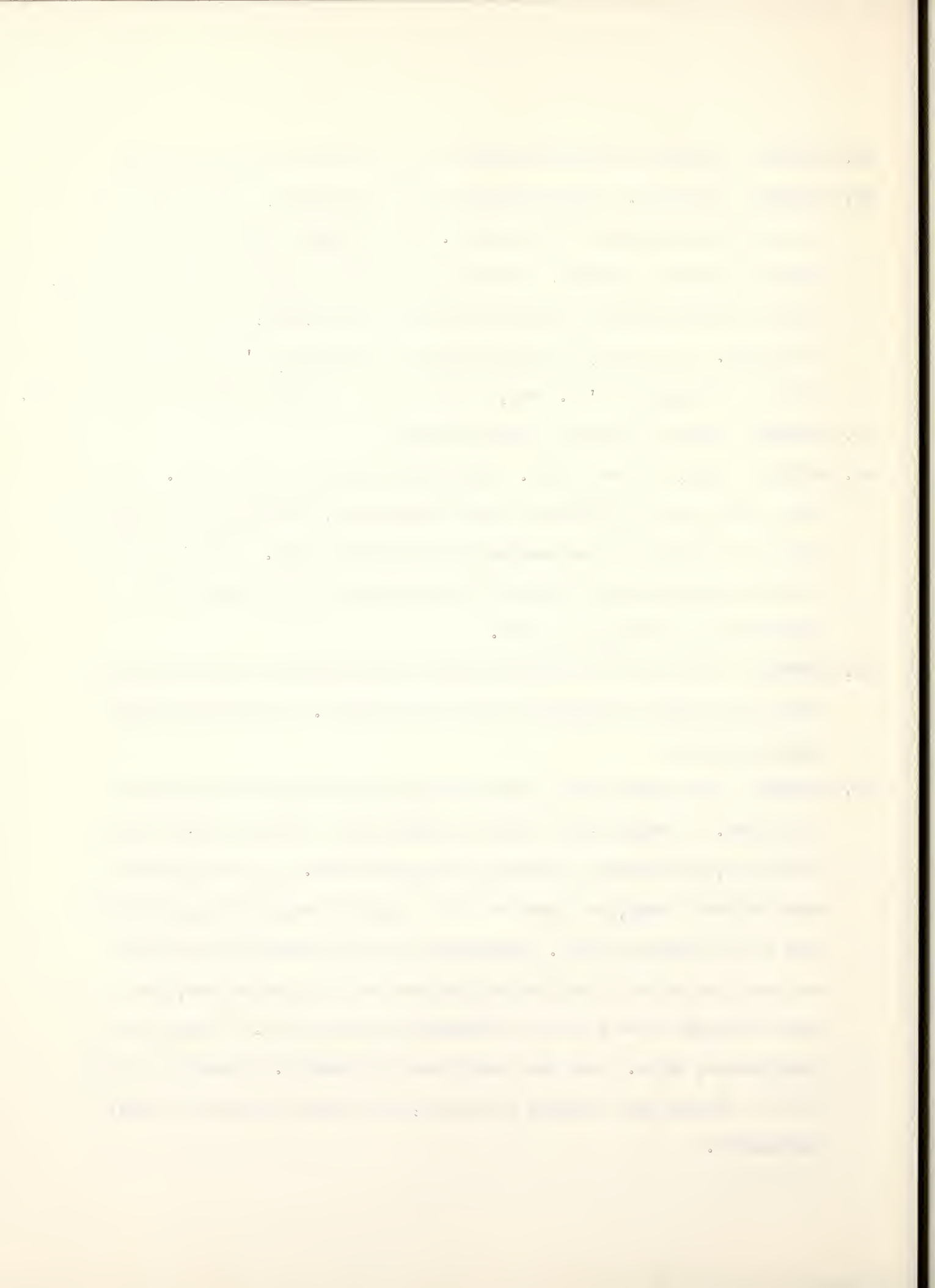
MR. WIERSEMA: Just time. Because engineers were unemployed , and we could get the very best engineers in the country. But it takes a month to negotiate with a prospective engineer. You had to get him to Knoxville for an interview, and by the time you get him here and started to work, why, one or two months had passed. As you see, we started Norris in the fall of '33, and started Wheeler in December of '33. Why, we just had a stupendous amount of work on hand.

DR. CRAWFORD: Was that your peak period of work?

MR. WIERSEMA: Well, no, not at all. We only had two dams at that time. At one time we had seven or eight dams under construction. But that was at the peak period of intensity of engineering with very little help. You see, each of the few engineers that we had had to do the work of maybe eight or ten engineers to get the work started.

DR. CRAWFORD: Can you tell me something about your decision to join the TVA and about your leaving the company, moving to Knoxville. How did all of that happen and when?

MR. WIERSEMA: It happened when I first came over here after the two weeks of consulting. I thought that I would be going back to Memphis where I still had my job, but the work in Memphis was slowing down. We had laid off so many engineers there, and there was such a need for engineering here in TVA that it just appealed to me. And then as I began to understand what TVA was about and began to read the Act and know what the purpose was, then it began to appeal to me from the sociological point of view. I could make a contribution, maybe. Much more than I could in Memphis. Gradually I just got the feeling that I wanted to be here, and finally I was on the staff permanently.



DR. CRAWFORD: Do you feel that most of the supervisory staff felt that it was a challenge?

MR. WIERSEMA: Absolutely! I never saw such a spirited devotion as there was among engineers who came here. Men never talked about being paid for over-time. They just worked over-time because they loved the job. It was an extreme challenge.

DR. CRAWFORD: When did you move to Knoxville, Mr. Wiersema? Were you able to take the time for that?

MR. WIERSEMA: Yes, well, what I really did was to bring my wife and children over here in the fall of '33 and rent a furnished house here. I rented for maybe two years before I finally had my furniture moved over here. I rented a furnished house for the first two years I was here.

DR. CRAWFORD: When did you first start thinking of TVA as a permanent job?

MR. WIERSEMA: Well, first when I was on the permanent staff I considered it a permanent job, but not permanent enough to move my family and household goods over here. So I would say that by the first of '34, I felt like I had a permanent job here for another year or two. But not for another two years did I become sufficiently convinced that it was going to succeed enough to move my furniture over here.

DR. CRAWFORD: What positions did you hold? What changes did you go through in your supervisory work?

MR. WIERSEMA: My first permanent position was as Assistant to the Director of Engineering Service. When that group was moved from Knoxville to Chattanooga, I went with them for the first two or three months and then was returned to Knoxville as the Assistant to the General Office Engineer. When he changed his position after three months I was made General Office Engineer, and kept

MR. WIERSEMA: that position until the title was changed to Assistant Chief Engineer, along about 1937 or '38. I was Assistant Chief Engineer until I retired.

DR. CRAWFORD: What year did you retire, Mr. Wiersema?

MR. WIERSEMA: 1960.

DR. CRAWFORD: And what have you done since then?

MR. WIERSEMA: Well, I did consulting work for the first five years. I consulted first with the Development Resources Corporation, of which Mr. Lilienthal was the head in New York. I stayed in New York for six months or so. I did some work in Atlanta, out of Knoxville, I spent a year in Seattle with R. W. Beck Company, consulting on engineering work, especially private power companies. I spent some six months in Vancouver with the British-Columbia Hydn Company, went to Iran with the Development Resources Company in '61, and after about 1965, I have done no consulting work at all.

DR. CRAWFORD: Can you outline and tell something about the engineering jobs that you've done since 1933, until your time of retirement?

MR. WIERSEMA: Well, that's a big order, because we built during the period twenty dams and six or seven steam plants, and my work was involved in all of that construction. There's no use in listing all of those dams, because those are all the dams that TVA has built up until Melton Hill, and I was at Melton Hill for a short time. The steam plants were the first seven large TVA steam plants. Of course, during that time we also did work of different kinds and other work in construction, but our main work was building the twenty dams and seven steam plants.

DR. CRAWFORD: When did the decision come to construct steam plants?

MR. WIERSEMA: During the war we were asked by the government to furnish them a vast amount of power for the Oak Ridge installation. We engineers determined

MR. WIERSEMA: that it would be impossible for us to guarantee this power if we (Cont'd.)

relied on hydro alone. So we told the government that we would have to have a steam plant to take care of what might happen, namely a shortage of water and there wouldn't be enough water to furnish hydro-power. The government authorized the construction of the Watts Bar steam plant, and that was built and in operation before the end of the war.

DR. CRAWFORD: And that was caused by the development of the Manhattan project?

MR. WIERSEMA: Right. That's what first caused it. Immediately after that, though, we saw that the load on the TVA system was going to increase and that we couldn't depend on hydro indefinitely. Then we asked to have the construction of the Johnsonville steam plant authorized. That happened shortly after the war. From then on we went to more and more steam, although we were almost hydro at the beginning of the war. Inside of five years afterward we were way up to maybe 80% steam and 20% hydro, and that's about where we are today.

DR. CRAWFORD: Did you feel that you had reached capacity with hydro power?

MR. WIERSEMA: We had developed all of the economically feasible power as fast as we could. There are a few hydro sites that could be developed, but the cost is almost as much or more than using steam. And it's certainly not enough in capacity, so that steam is absolutely necessary, you see.

DR. CRAWFORD: Do you anticipate further growth along the same lines in this region?

MR. WIERSEMA: Undoubtedly, and of course, we are turning nuclear power now for fuel. So far we have used only coal up until the time that we started to develop our nuclear power plants. We have thought of gas or oil, but I think development will be limited to coal and nuclear fuel, and only a few minor hydro developments will take place.

DR. CRAWFORD: How do the costs of hydro power and steam power compare?

MR. WIERSEMA: Of course, our first hydro power was much more economical than steam, because we had the most economical sites to develop first. As we developed more and more hydro the cost began to increase. The cost of land increased, the cost of fuel increased, and before too long steam became competitive with hydro. Today steam is very competitive with hydro--almost cheaper than hydro, and coal is competitive, of course, with nuclear fuel, too.

DR. CRAWFORD: Where do you get your coal supply?

MR. WIERSEMA: Mostly from Kentucky. Kentucky is our big source of supply. We've spent over a billion dollars for coal from Kentucky alone--a tremendous amount. We get some from Tennessee, some from southern Illinois, some from Alabama, but Kentucky is our big source.

DR. CRAWFORD: How long would you estimate that the coal supplies would last at the present rate?

MR. WIERSEMA: It wouldn't last more than a hundred years. There is this, however, that coal will become more expensive, because the best coal mines will become used and the coal will become progressively more expensive and also, the uses for coal for chemicals will be increasing all of the time. So the competition for coal will increase.

DR. CRAWFORD: When was nuclear power first considered?

MR. WIERSEMA: About 1960, I would say. Or maybe before that.

DR. CRAWFORD: What were your first thoughts about it?

MR. WIERSEMA: Mixed. Well, we thought that it didn't seem logical that nuclear power or uranium could possibly compete with coal which we could get right here in Tennessee, but as we studied the problem we could see that nuclear fuel was something that was a by-product of the defense program, So for that reason it could probably be produced cheaper than coal.

DR. CRAWFORD: How does this compare in cost now?

MR. WIERSEMA: Right now it's competitive. For instance, we decided to build the Brown's Ferry as a nuclear fuel plant. After that we built the Cumberland steam plant next in succession and Sequoia as a nuclear. So it's just nip and tuck as to which is the more economical right now.

DR. CRAWFORD: All three types of power, then, coal, hydro, and nuclear, are roughly competitive at the present time.

MR. WIERSEMA: They are roughly competitive. In the Tennessee Valley, coal is the most logical right at this moment, because hydro is too fully developed. Of course, when you say three, nuclear is only a fuel. Steam is the real word to use for the power. The power is produced by the steam, but we used either nuclear fuel or coal for fuel. You can also use either gas or oil.

DR. CRAWFORD: Has gas or oil been used in this area?

MR. WIERSEMA: Not by TVA. It has been in the adjacent areas. Natural gas coming from the Texas and Louisiana oil fields is very economical. We asked to have our Memphis plant authorized for the use of gas, and the Federal Power Commission turned it down saying that gas should be used for such things as domestic heating for which it was more adaptable. And since coal could be used in steam plants, it would be more profitable for the nation if we used coal for these huge steam plants and used gas for domestic use.

DR. CRAWFORD: What would your estimate of future development be? Do you suppose it will be mostly nuclear fuel?

MR. WIERSEMA: No, I think coal will still be competitive with nuclear fuel in the next ten or fifteen years.

DR. CRAWFORD: What sort of building program do you foresee needed by TVA?

MR. WIERSEMA: Just as they are doing now. They are building more and more steam plants as the load increases. Of course, when you say TVA program, that means a lot of other things. TVA can do a great deal in the field of recreation, in the field of flood protection, and in the field of development of our resources.

DR. CRAWFORD: Did you do much work, yourself, in the field of flood control?

MR. WIERSEMA: With the Morgan Engineering Company I did a great deal of flood control work.

DR. CRAWFORD: Did you do that with TVA?

MR. WIERSEMA: And with TVA as far as it relates to the dam construction, because almost all of our dams have multiple purposes of navigation, flood control, and power. So as far as flood control from the dams is concerned, I was intimately associated with that. But I wasn't associated with the minor flood protection projects, excepting the proposal to protect Chattanooga from floods. On this I worked quite a bit.

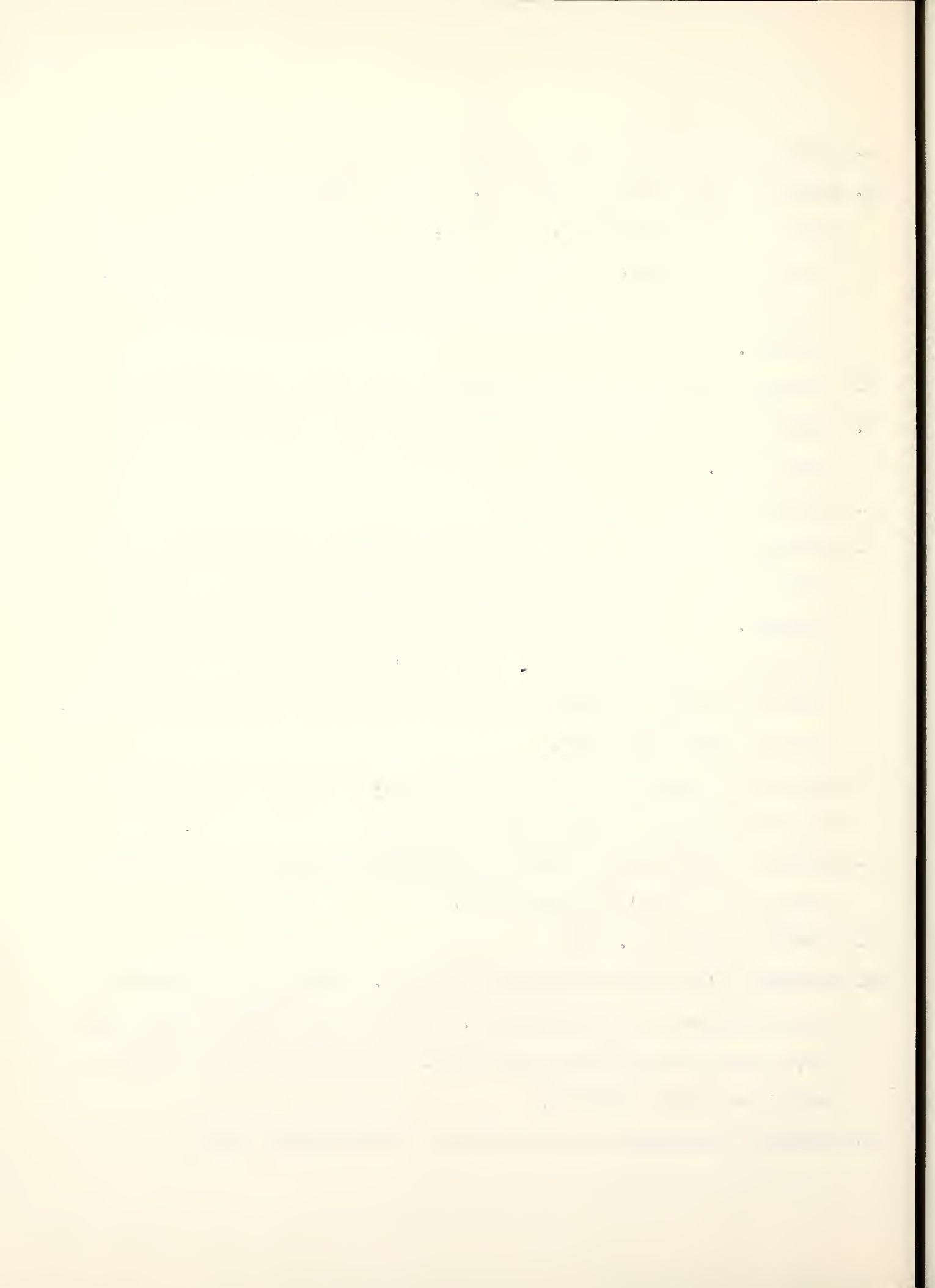
DR. CRAWFORD: What people who are still living, Mr. Wiersema, have had most to do with the navigation and flood control aspects?

MR. WIERSEMA: Charlie Okey was with flood control; Porter Taylor was with navigation, (Porter Taylor's still with TVA).

DR. CRAWFORD: Where is Mr. Okey?

MR. WIERSEMA: He's retired and living in Knoxville. There are, of course, many others, but those are the main people. TVA has a large navigation force right now, and also a large flood control force. You can find a lot of the flood control people still with TVA.

DR. CRAWFORD: Did you do all of your work out of the Knoxville office?



MR. WIERSEMA: Yes, with the exception of the three months that I spent in Chattanooga with the Engineering Service Division.

DR. CRAWFORD: Do you feel that the headquarters of TVA was well-located?

MR. WIERSEMA: Very much so. I think that was the best headquarters there could be. As you know, the Act said that we should have our headquarters at Muscle Shoals, and technically our headquarters were there, but for the main bulk of the work of the Board, I think Knoxville was the logical place to locate.

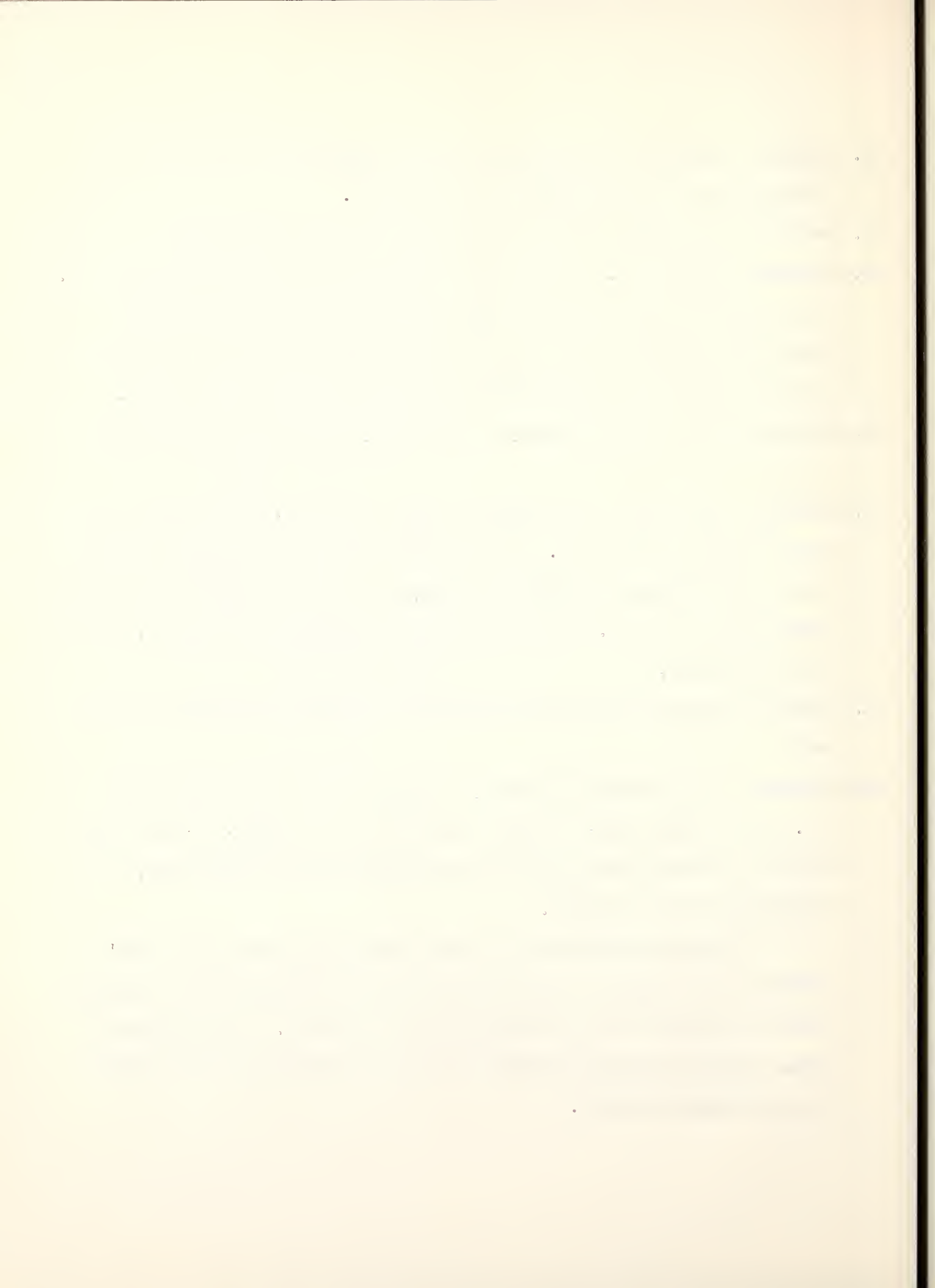
DR. CRAWFORD: What engineering needs, as you retire, did you see still unfulfilled at TVA?

MR. WIERSEMA: Well, we had a very adequate engineering force. We were able to do any work that was authorized. I felt that TVA should get into broader fields such as recreation and local flood control, but we had a sufficient engineering organization to do that. We had a very large engineering organization, as you know it has today.

DR. CRAWFORD: What major engineering work has been done for recreational development?

MR. WIERSEMA: The Land Between the Lakes, I think, is the most important right now. When we first started we were very active in recreation. The Big Ridge Park here on Norris Reservoir, the parks at Norris Dam and Wheeler Dam, and the Pickwick Dam are examples.

Then, for many years our General Counsel felt that the Act didn't authorize TVA to engage in recreation, and they did nothing except to encourage states and counties to use our facilities for recreation. Then along about 1965, I believe, we did get authority to engage in recreation and we started the Land Between the Lakes.



DR. CRAWFORD: Which General Counsel was that, sir? Was that Lawrence Fly? Joseph Swidler?

MR. WIERSEMA: Mr. Fly was here only at the very beginning, and he left very soon.

DR. CRAWFORD: About '37 or '38, I believe.

MR. WIERSEMA: About '38, I believe. We were going into recreation at that time. After '38, Mr. Swidler came in, and I think we decided that we couldn't engage in recreation as such.

DR. CRAWFORD: So you had a period, then, when TVA didn't. . .

MR. WIERSEMA: . . .didn't actively engage, although we still encouraged states and counties to use our facilities for recreation.

DR. CRAWFORD: Did you take into consideration in your engineering factors such as fish supply for recreation?

MR. WIERSEMA: Fish supply? Do you mean inside of our reservoirs?

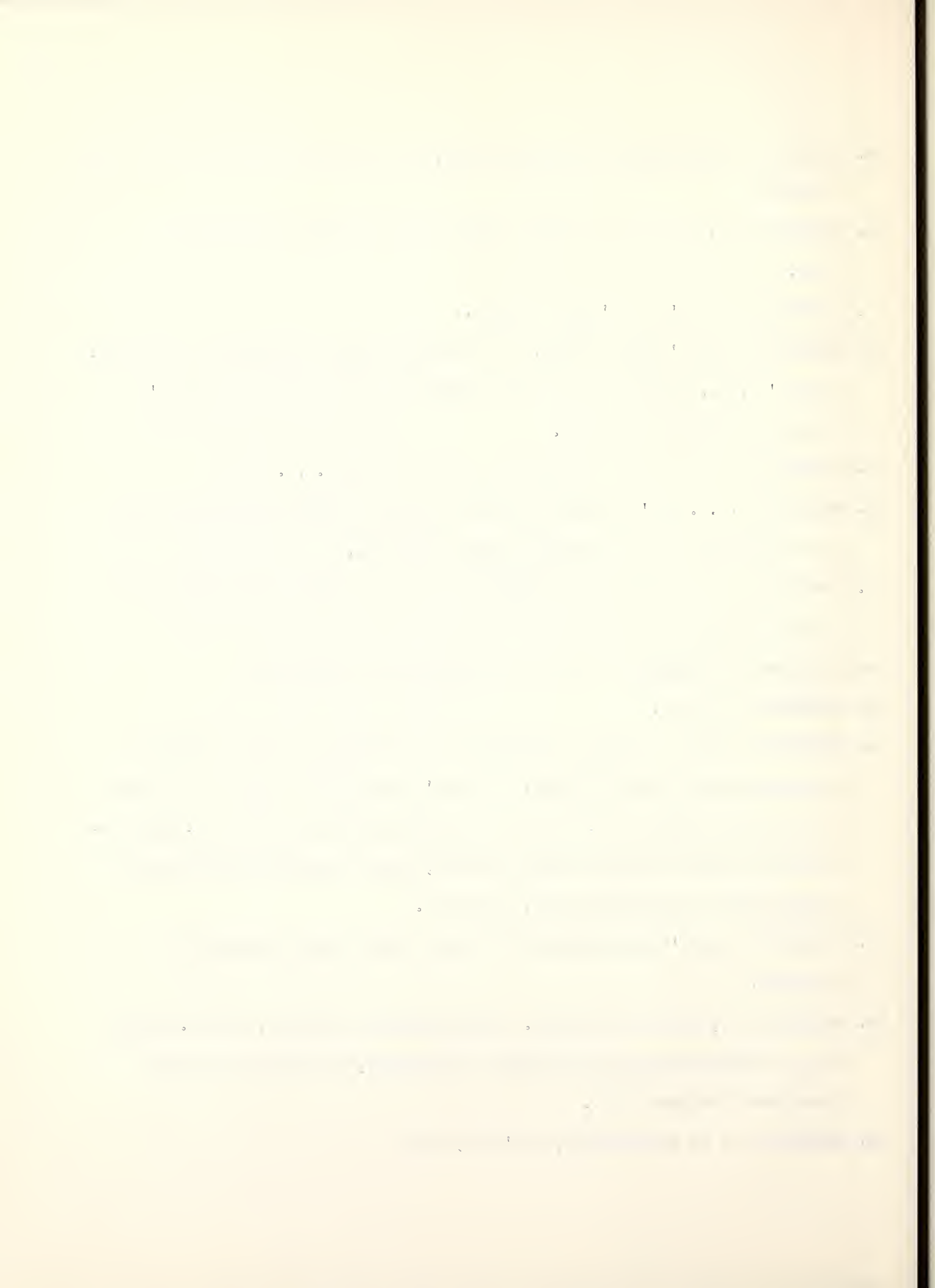
DR. CRAWFORD: Yes, sir.

MR. WIERSEMA: Well, only that we cleared the reservoirs, but that we did for power more than we did for fish. We didn't purposely design the reservoirs to cultivate fish, but TVA had a fishery department from the very beginning. Fish and wildlife were the concern of TVA, and we co-operated with them in anything that they wanted to do, of course.

DR. CRAWFORD: I didn't know whether that was a part of your department or separate.

MR. WIERSEMA: No, that was separate. It was located at Norris, and Dr. Wiebe, who is still alive and you may wish to interview, was the head of that department for many years.

DR. CRAWFORD: He is in Knoxville, isn't he, sir?



MR. WIERSEMA: He is. He lives in Norris in the summer, but at the Andrew Johnson Hotel in the winter. My work, as you know, was mostly building up the organization. When I first came in '33, we had almost no engineers at all. I think that I was one of two or three engineers that we had. During the years I did a great deal of recruiting of engineers, building up the organization, designing the methods of developing engineering groups, and my work was almost entirely administration from perhaps 1936, on.

DR. CRAWFORD: Did you regret getting out of engineering at any time?

MR. WIERSEMA: I always enjoyed my work, and I retained sufficient engineering to keep my interest; whereas, administrative work appealed to me as being important and worthwhile.

DR. CRAWFORD: Were you able to secure the engineers that you wanted for the work?

MR. WIERSEMA: Mostly. Especially at first when the engineers were out of work we had no trouble at all. During the war (that's the Second World War, of course) when many engineers were called into the service, we were short of men for quite a while. We asked for a few deferments for some of our key men, but we tried not to ask for deferments and tried to replace our vacancies of men leaving for the service in the best way we possibly could, and we were rather short. As soon as the war was over, why, the men returned and we had no difficulty after that.

DR. CRAWFORD: Why was TVA so successful in recruiting the needed people?

MR. WIERSEMA: In the beginning because of the depression. Engineers were out of work and were glad to take anything. Then the engineers who came here became enamoured of their work and saw the possibilities and would write to their friends. So their friends would become interested. So we had really no difficulty recruiting at all until the war started, as a matter of fact.

DR. CRAWFORD: The depression was a factor. Apparently the challenge of the work was another.

MR. WIERSEMA: The challenge was the same. The depression was the first, and that got them in here. The challenge of the work was what led more men to come on in and for men to stay here, too, because engineers proverbially move around. But men went from one dam to another because they liked to stay with the TVA.

DR. CRAWFORD: Ho was the financial compensation? Was it comparable with other engineering work?

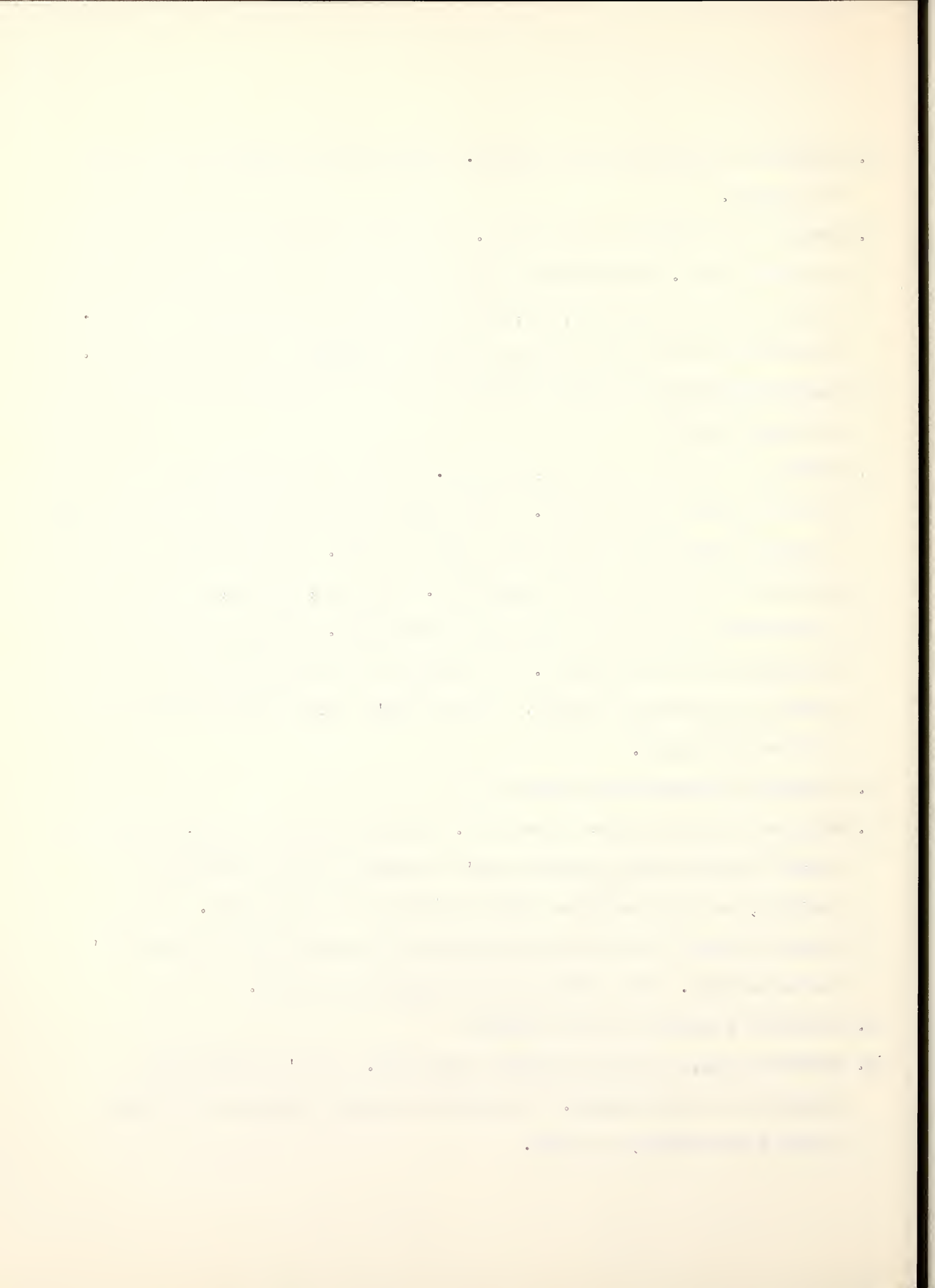
MR. WIERSEMA: At first it was very, very low. We had a federal scale, and we had a retention of ten percent. The salaries were so low they were ridiculous. A college graduate would get ninety dollars a month. That was because of the depression and because of the regulations. Very soon, however, we formed an organization called the TVA Engineering Association. We bargained with the management of TVA for salaries. Our salaries soon became commensurate with the federal and almost with private. I think they're still somewhat below private engineering salaries.

DR. CRAWFORD: Who formed this organization?

MR. WIERSEMA: There were quite a few of us. At that time I was with the Engineering Service Division and my position wasn't too high to qualify for being an employee, and I was among the others who formed the organization. As my salary increased I came into the management class, and I had to resign from the association. But I always was very sympathetic to them.

DR. CRAWFORD: Who were the first officers?

MR. WIERSEMA: Well, I was the treasurer at one time. I can't remember the engineers who were officers. At that time they were employees in the lower grade of engineering, of course.



DR. CRAWFORD: Did you find the TVA sympathetic to your attempts to improve the condition of the engineers?

MR. WIERSEMA: Very much so. I remember that one of the first things that we proposed was that instead of working six days a week, 39 hours--seven hours for five days and five hours on Saturday--we proposed to work forty hours, five days a week, eight hours a day. The TVA was sympathetic and that was adopted almost at once. Many of the things that we suggested were approved. Air conditioning for our engineering offices was almost immediately approved by TVA. TVA was very sympathetic to our interests to organize and improve our conditions.

DR. CRAWFORD: Were you generally able to keep the engineers you had?

MR. WIERSEMA: Very much so. We have many engineers like myself, who came to TVA and stayed until they retired--many of them stayed until they retired. I have a list of what I called "Old Timers." I have a list of 450 engineers who worked with TVA between 1933 and 1940. About half of them left TVA, and about half of them still stayed with TVA.

DR. CRAWFORD: That was a remarkable record for engineers, wasn't it?

MR. WIERSEMA: Isn't that remarkable? Remarkable record, it is.

DR. CRAWFORD: Would it be possible, Mr. Wiersema, for you to write down the names and addresses of a few of those you consider most important?

MR. WIERSEMA: Who are still living?

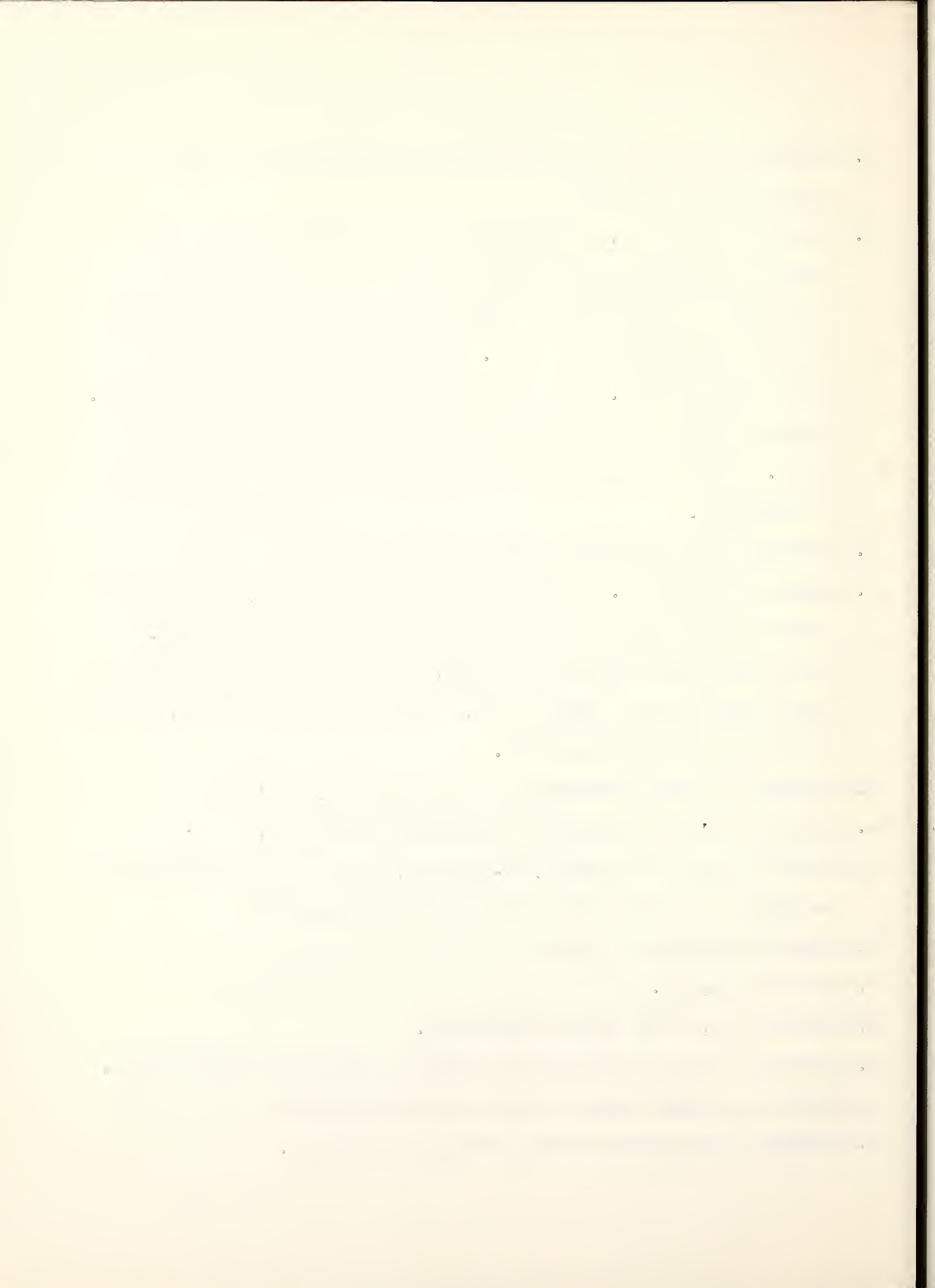
DR. CRAWFORD: Yes, sir.

MR. WIERSEMA: Yes, I will do that very readily.

DR. CRAWFORD: I would appreciate it very much and would hope to interview them.

MR. WIERSEMA: No matter where they are in the United States?

DR. CRAWFORD: I think we could get to them wherever they are.



MR. WIERSEMA: All right. I'll give you those that I think are the most important.

DR. CRAWFORD: What about the management of TVA in the early period, Mr. Wiersema? Who was your immediate superior in the organization?

MR. WIERSEMA: When I left it was George Palo. Prior to that it was George Leonard. Prior to that it was C. E. Blee. Prior to that it was Colonel Parker. Prior to that it was Mr. Leauregard, and prior to that it was Ned Sayford.

DR. CRAWFORD: Which of those people are still living today?

MR. WIERSEMA: Only George Palo.

DR. CRAWFORD: Where is he now?

MR. WIERSEMA: He retired recently and is living here in Knoxville.

DR. CRAWFORD: Did any of these people have time to write their memoirs or a biography?

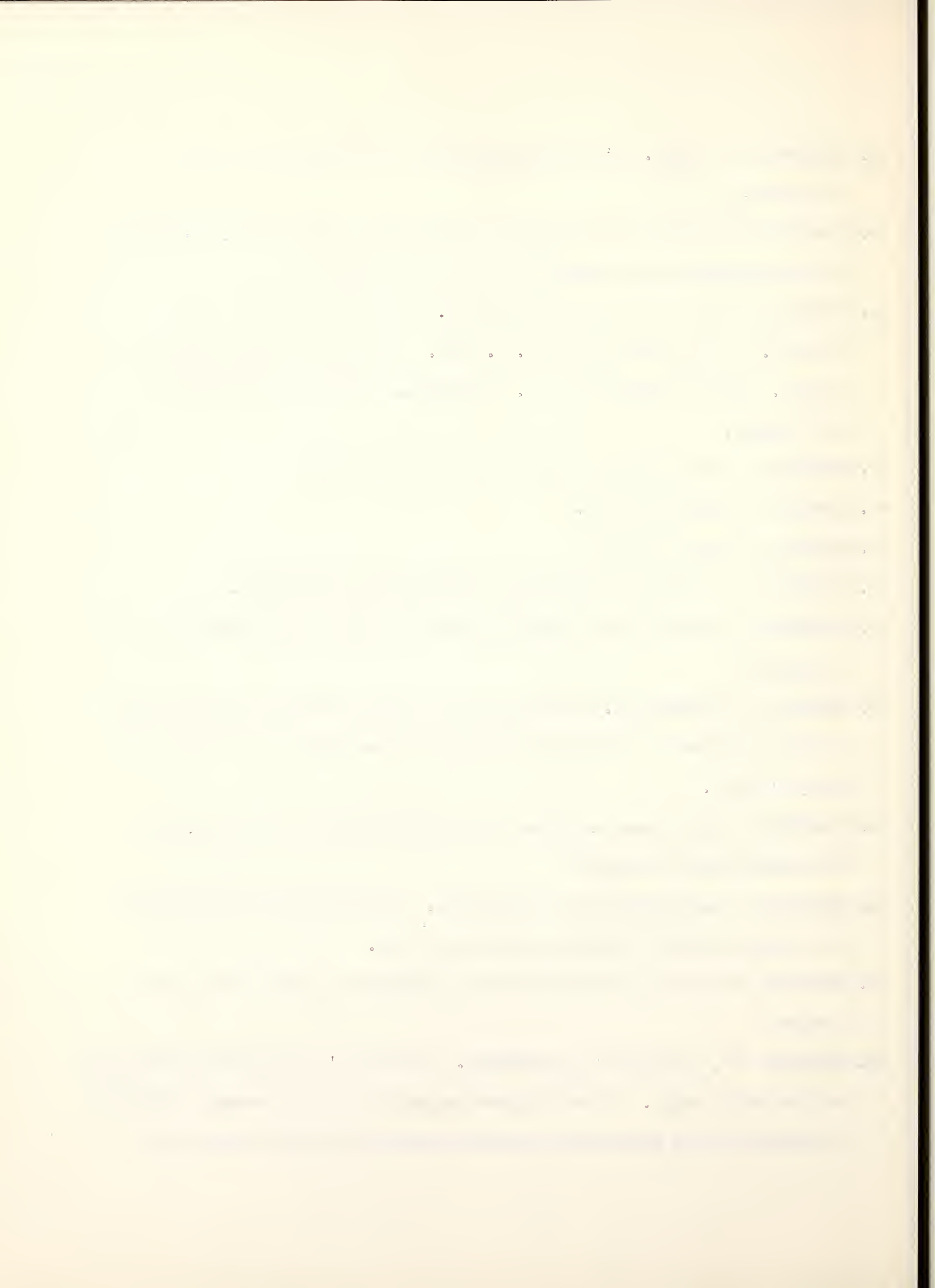
MR. WIERSEMA: I believe not. All of them were members of the American Society of Civil Engineers, and a brief obituary has been written for all of those men, I'm sure.

DR. CRAWFORD: Did you spend much time at the different dam sites, or did you work mainly from the office?

MR. WIERSEMA: I worked mainly from the office. I made trips to the different dam sites, oh, maybe three or four times a year.

DR. CRAWFORD: What did you think about the sociological affect of TVA on the region?

MR. WIERSEMA: Oh, I think it's remarkable. I think it's changed the whole aspect of the whole valley. It made it more progressive and the economic conditions increased and the educational facilities increased and they became more



MR. WIERSEMA: enlightened and a much more progressive society.
(Cont'd.)

DR. CRAWFORD: Have you noticed a change in the degree of industrialization?

MR. WIERSEMA: Oh, very much so. We have a division of TVA that encourages industry. I think that Taylor was in charge of that, too, as well as navigation, and he can tell you all of the different efforts and the success in getting industry to come here. It was very remarkable. It was caused by navigation and supply and labor. Of course, there were other reasons why these industries were attracted to this region.

DR. CRAWFORD: Do you believe that TVA will still continue to supply adequate power for the development of industry?

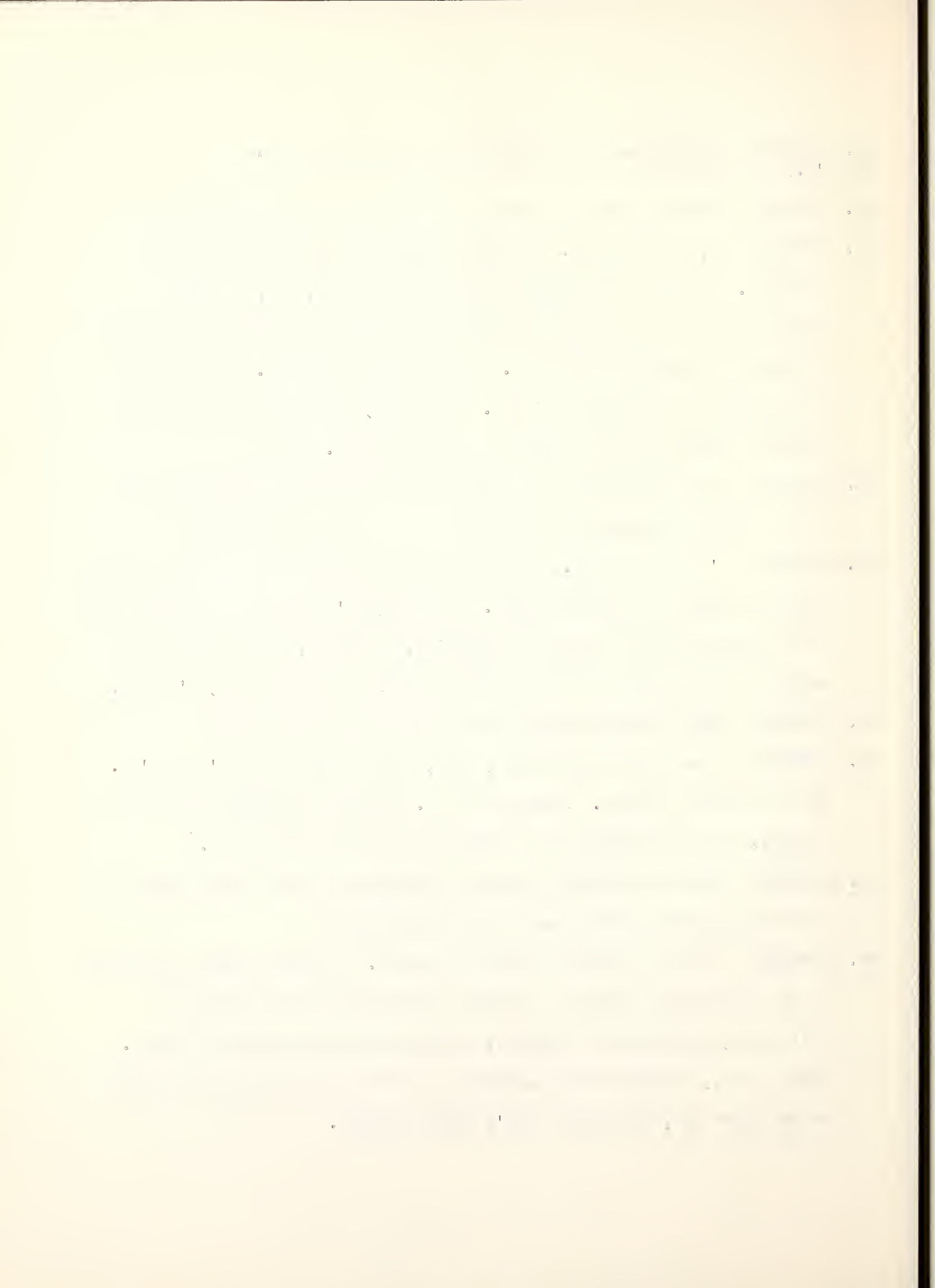
MR. WIERSEMA: I'm sure it will. One of the main objectives of TVA is to furnish adequate power at a very low price. You know, it's lower than anywhere else in the United States, except in Bonneville, I believe, and they will always continue to have that in front of them as their main objective, I'm sure.

DR. CRAWFORD: Whose decision was that--to supply power at low cost?

MR. WIERSEMA: It was made by the Board, very, very early--perhaps '34 or '35. It was a Board decision. I think that Mr. Lilienthal influenced the Board greatly, but it certainly was a unanimous decision of the Board.

DR. CRAWFORD: What do you think about the strengths--not necessarily weaknesses--but the strengths of the Board in the early period?

MR. WIERSEMA: It was a very good Board--very broad. The Board made a bad mistake in the beginning by dividing up their responsibilities into power for Lilienthal, engineering for Morgan, and agriculture for Harcourt Morgan. Even at that, it might have succeeded had it not been for the personalities of the three men, which just didn't click together.



DR. CRAWFORD: Do you believe that it would have been a wiser policy had this division not been made?

MR. WIERSEMA: Very much wiser if they had all three acted on all of the activities. They could have delegated these different activities to subordinates. But when they acted as a Board they should have been completely understanding of all of the activities, because decisions made by the Board are administrative decisions. They are not engineering or technical decisions. The technical part could have been performed by subordinates who then would have reported to the Board, and the Board could have made an un-biased, administrative decision.

DR. CRAWFORD: Were the technical decisions generally made on a sound basis on the engineering data?

MR. WIERSEMA: I think they were. I'm pretty sure they were, because we did have competent engineers, and Dr. Morgan himself was a competent engineer. But I think it would have been better, you see, if those engineering decisions had been made by the Board as a whole and not by Dr. Morgan. The same refers to power and the same refers to agriculture.

DR. CRAWFORD: Do you believe that would have minimized conflict on the Board?

MR. WIERSEMA: I think it would. It might have even minimized it so that all three could have continued for years, although there was this personality clash which might have prevented that. It's difficult to tell.

DR. CRAWFORD: Do you feel that all three Board members were involved in the personality clash, or only Mr. Morgan and Mr. Lilienthal?

MR. WIERSEMA: Well, unfortunately, Dr. Harcourt Morgan saw fit to side with Mr. Lilienthal almost in all cases, which was too bad. He wasn't involved himself, but he just happened to choose to side with Lilienthal. That, of course, made it an impossible situation for Dr. Morgan--Dr. A. E. Morgan.

DR. CRAWFORD: Do you believe that it would have been wise to have appointed a General Manager at the beginning? I believe Jack Blandford was the first.

MR. WIERSEMA: He was called a co-ordinator. He wasn't called a General Manager. Yes, I think that might have been wise if they could have found the exact right man for that. It's a difficult job to fill, of course, but it would have left the Board more free to make administrative decisions rather than to try to do administrative work, as such.

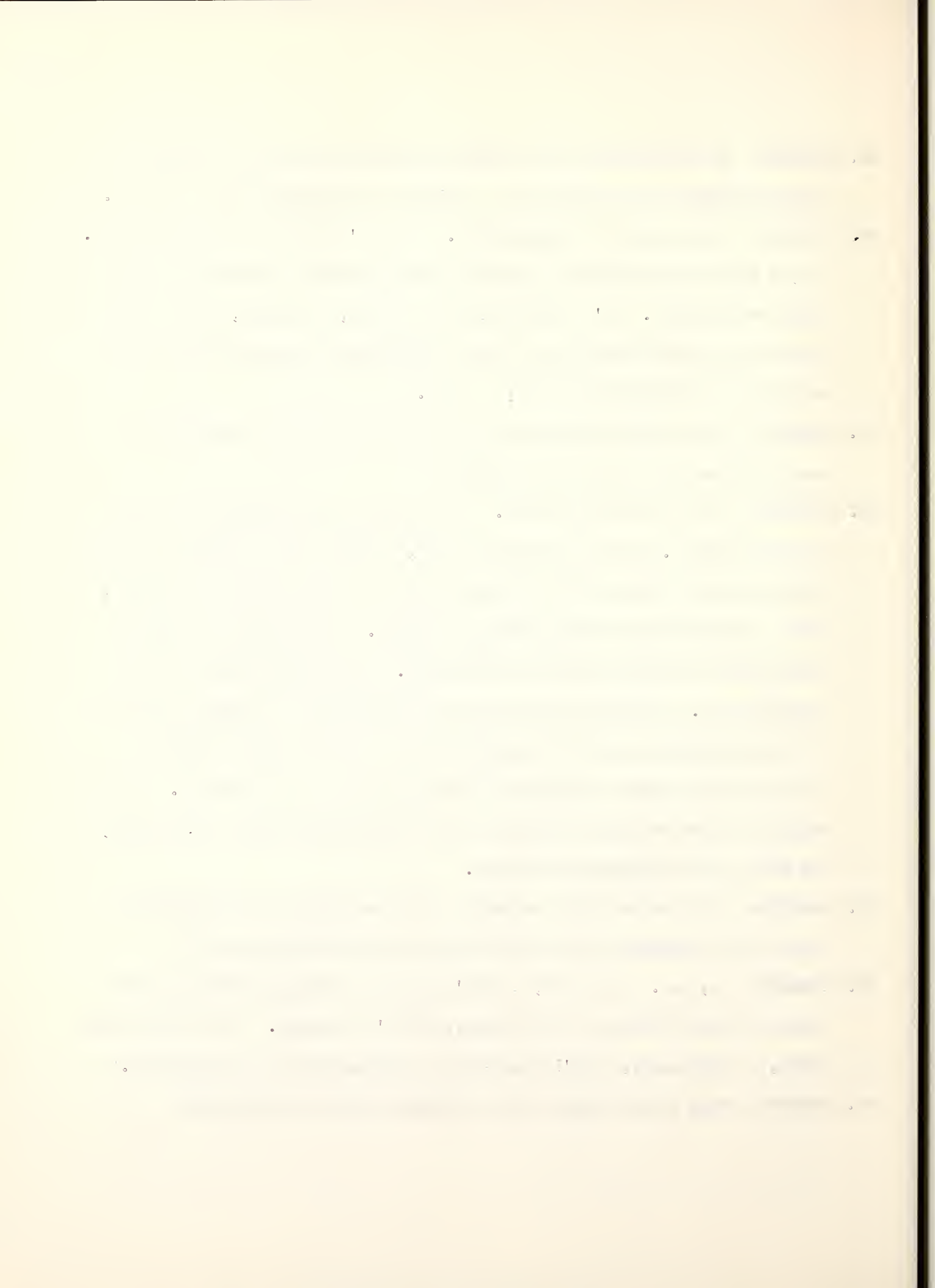
DR. CRAWFORD: Do you believe that the opposition from the power companies had much influence on the way TVA developed?

MR. WIERSEMA: Not to any great extent. It did make us, perhaps, more cautious in our forecasts. But as a matter of fact, I think that we would have been almost the same without the opposition as far as engineering is concerned. What it did was to put our people in a turmoil. Many engineers resigned because they felt that TVA was so uncertain. They wanted to have a more permanent job. Many came to us from large corporations and they went back to the corporations when the depression was over because they felt that TVA was not the kind of organization that they wanted to belong to. So the opposition from the power companies had a detrimental affect on the whole, but not on the engineering decisions.

DR. CRAWFORD: Were people in the Authority very much alarmed by the conflicts such as the Ashwander case and the Eighteen Power Companies case?

MR. WIERSEMA: Oh, yes. As I said, I didn't bring my furniture over here for a couple of years because I just thought, "They'll succeed. They have so much money, so much power, they'll succeed in stopping TVA one of these days."

DR. CRAWFORD: When did you begin to get confident that they would not?



MR. WIERSEMA: Oh, after the Ashwander case was settled by the Supreme Court I thought, "Well, perhaps after all we'll succeed." It wasn't until the Ashwander case that I was convinced that it was going to succeed. In fact, I think that I was the only engineer that bought a house in Knoxville for almost five years. They all said, "Well, there's not any sense in buying. We'll just keep on renting. We won't be here too much longer, anyway."

DR. CRAWFORD: That was a vote of confidence. I suppose.

MR. WIERSEMA: As far as I was concerned it was, and I decided to buy a house.

DR. CRAWFORD: Do you think of any projects that you feel should have been adopted by TVA that were not?

MR. WIERSEMA: Well, of course, Chattanooga flood control should have somehow been forced through. We tried our very best, but were unable to do it. Maybe if we had concentrated more effort on it we could have gotten it. Maybe if we had concentrated more effort on it we could have gotten it. Chattanooga is vulnerable to floods right now. It's a shame. The people in Chattanooga don't know it, but they're liable to be flooded out at any time, because the upstream works are not sufficient to cover complete flood protection. The same is true of Gatlinburg. Gatlinburg is extremely vulnerable to floods right now. We did our best. We wrote the mayor over and over again to take care of his city, but we were unsuccessful. What we could have done, though, I just don't know.

DR. CRAWFORD: Why did those flood control projects not get adopted?

MR. WIERSEMA: Obviously it was the people. The people in Gatlinburg just didn't believe us. They thought they had never had a flood before, why should they have one in the future? They didn't believe in the engineers and that they knew anything about rainfall at all. The people in Chattanooga said that they had had their flood in 1864, and they weren't going to have another one.

MR. WIERSEMA: We showed them pictures of a whole city covered, and they said, (Cont'd.)

"Oh, well, you've got your dams built. That will stop it from flooding."

We told them that that was not adequate to stop all of the floods that might occur, but they just didn't believe us, I guess, or maybe they were opposed to taxing themselves to pay for this flood control.

DR. CRAWFORD: Did any of Arthur Morgan's projects that were not adopted seem to have particular merit?

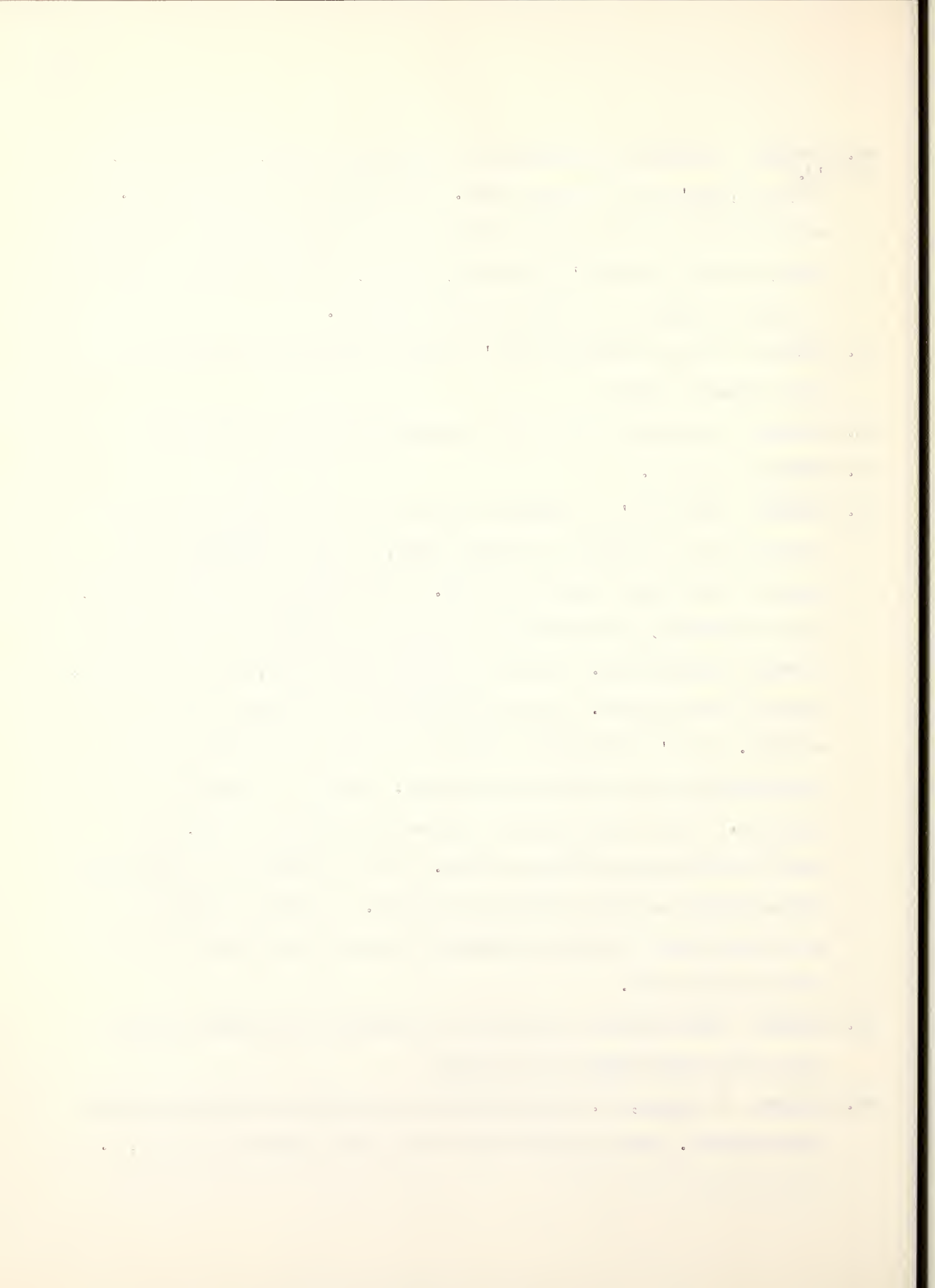
MR. WIERSEMA: Do you mean things that he suggested while he was with TVA?

DR. CRAWFORD: Yes, sir.

MR. WIERSEMA: Well, that's a difficult question to answer because many that he suggested were successful to a certain point, and it is difficult to say how much further they should be pursued. For instance, the ceramic project, which he promoted, did a great deal of work and now ceramics are being carried on under a private firm. The work of genetics with trees, which he proposed, went to a certain point. It did some good and is now being pursued by TVA actively. I don't believe that there was too much that he suggested and was discontinued that did TVA too much harm. I think his suggestions were very good. I think that support was not as cooperative as it might have been in pursuing some of these projects. But I do think that his suggestions were worthwhile and made a contribution to TVA. It might have been more if he had stayed with TVA, but nevertheless it is hard to say that it was bad not to continue them.

DR. CRAWFORD: What different advantages do you believe were brought to TVA by each of the three original Board members?

MR. WIERSEMA: Of course, Dr. Morgan brought the imagination for the whole scheme of development. He also brought some of the finest engineers in the U. S.



MR. WIERSEMA: I don't mean myself, but other engineers who had been on his staff.
(Cont'd.)

He was instrumental in staffing engineers to a large extent.

Lilienthal brought, of course, his knowledge of power, his theory that cheap power was beneficial. His overall social ideas, I think, were good, too.

Harcourt Morgan brought, of course, his background in the University as university president and his work in agriculture. Each of the three made a contribution.

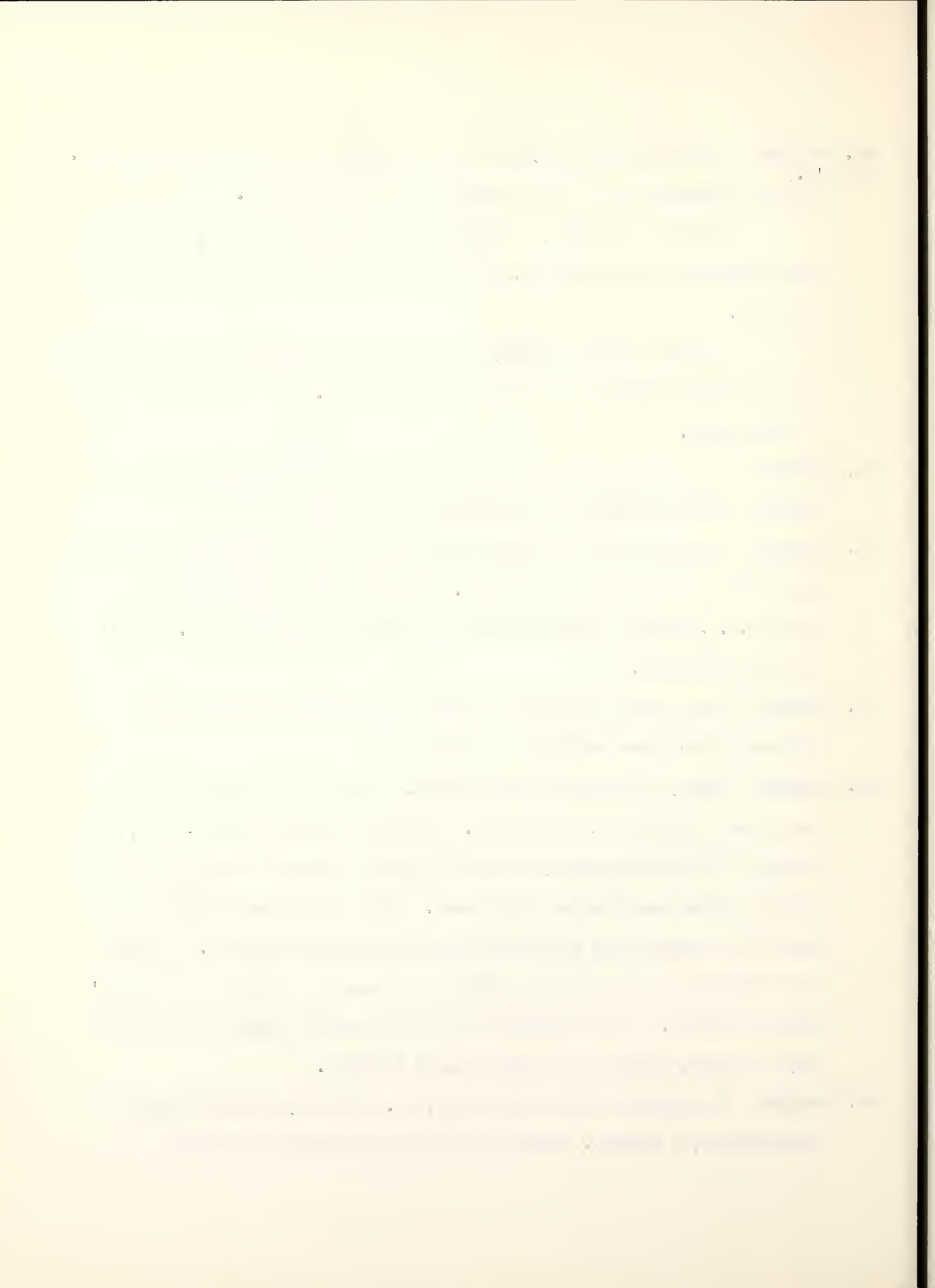
DR. CRAWFORD: Do you believe that Harcourt Morgan contributed successfully in bringing about acceptance by the people in the region?

MR. WIERSEMA: I think that he had some influence to that extent, but I think the people were going to accept us anyway. Without him we would have been accepted. . . if we had some other director beside Harcourt Morgan. That's my personal opinion.

DR. CRAWFORD: What seemed to be accepted best by the people of the region?
The power? The flood control? The navigation?

MR. WIERSEMA: Power, I think was accepted most. They were so anxious to get power, especially in the rural areas. The most gratification, I think, was brought by the power program, and of course, the economic development came from the actual construction of the dams. Later on the agriculture program began to be appreciated, and still later the navigation program. I think the navigation was last, because until the channel was completed it couldn't have much effect. Once completed, then the navigation began to have effect and, of course, brought in a great deal of industry.

DR. CRAWFORD: To continue with your TVA work, Mr. Wiersema, you spent some time in Washington, I believe. Can you tell me what your work was there?



MR. WIERSEMA: Attending meetings, such as conferences on surveying in the beginning, liason for the war college on power, meetings with the budget bureau. I accompaniess Dr. Morgan on several of his budget hearings to assist him in presenting his annual budget to the appropriations committee-- mostly work with committees and work of that kind.

DR. CRAWFORD: Did you work closely with other government agencies?

MR. WIERSEMA: Of course, with the Army of Engineers. The engineering work was very closely coordinated with the Army Engineers, because they, of course, operate the locks that we built for them. We cooperated with the Geological Survey and quite a few others.

DR. CRAWFORD: Did you have satisfactory relations with every government agency?

MR. WIERSEMA: Oh, we had no difficulty with any government agency. The Bureau of Relcamation was our closest associate on the design of the dams.

DR. CRAWFORD: What sort of staff did you maintain in Washington?

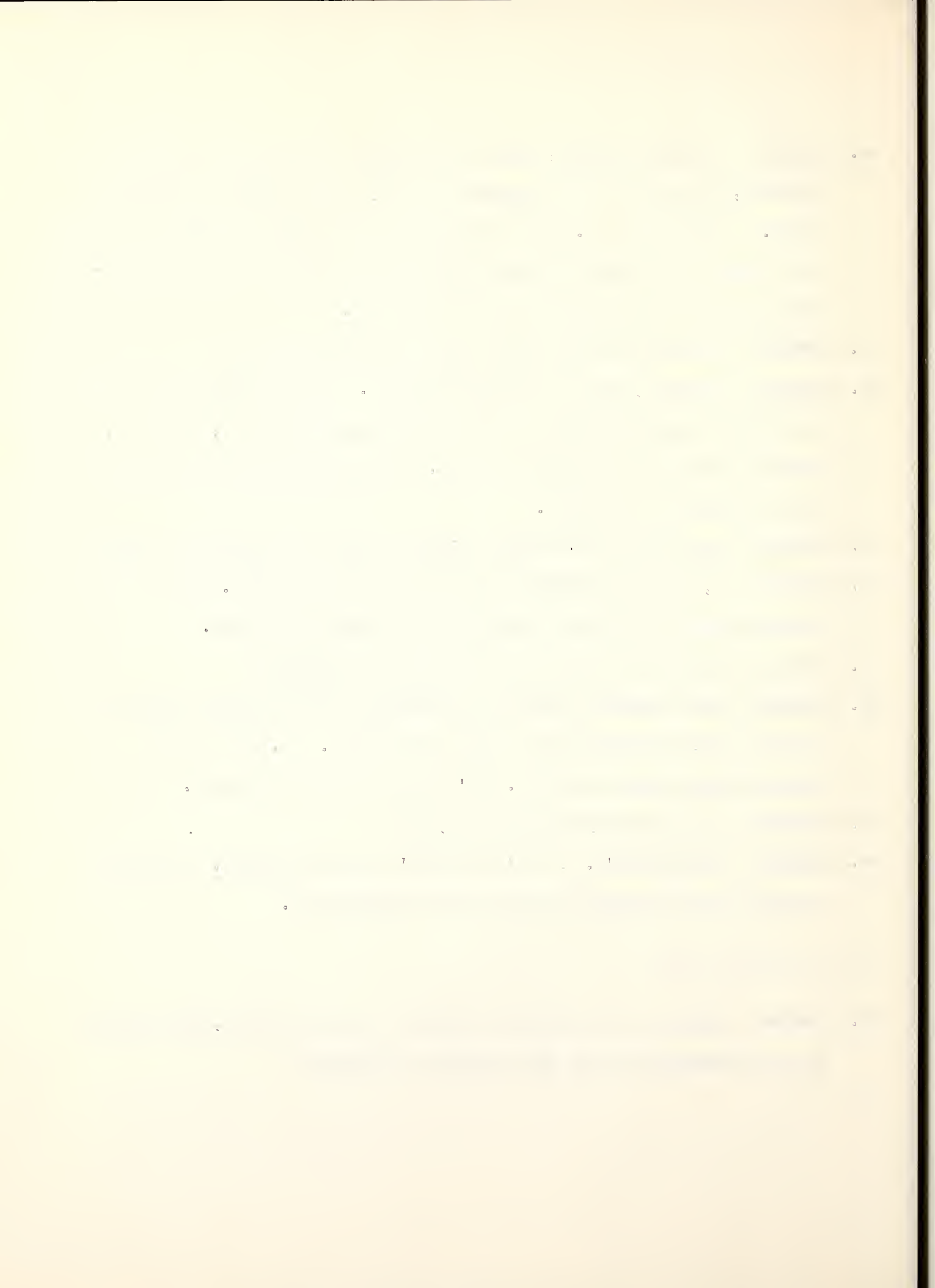
MR. WIERSEMA: Miss Marquerite Owen was our director there for a long time, and she had a staff of three or four clerks and helpers. Mr. Dix was our engineering man there on surveys. He's been there for many years.

DR. CRAWFORD: Do you remember his full name, sir?

MR. WIERSEMA: I really don't. I don't think he's there any longer. You can get that from the Chattanooga maps and surveys organization.

I N T E R R U P T I O N

DR. CRAWFORD: During your time with the Tennessee Valley Authority, what projects or what activities gave you most personal satisfaction?



MR. WIERSEMA: Well, I think that administering the office of Chief Engineer gave me more satisfaction than anything else. In that office I was in charge of all personnel work, all organization, all budgets and all reports. And of the three I think that reports were more important to me. We had a complete set of all reports under my supervision of every dam and every steam plant. We produced a set of books, around twenty in number, all of them well-prepare and organized and printed. You would hear about them all over the world. I travelled around the world in 1966, and everywhere that I went they had heard about the TVA publications for which I, of course, was responsible. It was extremely gratifying to have these reports so well-received.

DR. CRAWFORD: The engineering department at the Tennessee Valley Authority was well-known and well-received in the American engineering community, wasn't it?

MR. WIERSEMA: Very well.

DR. CRAWFORD: And in the nation?

MR. WIERSEMA: Very much so. All of our engineers were recognized in the American Society of Engineers eyes. They were asked to give speeches, talks, put on committees. I was on a national committee for four or five years while I was with TVA.

DR. CRAWFORD: What were the difficult times with TVA? Did you have one when Mr. Arthur Morgan left? Did you have any difficult times in World War II? And did you have any after President Eisenhower's election?

MR. WIERSEMA: During Mr. Morgan's quarrel, you might say, difficulty, there was some disruption, but I don't think that it interfered with our engineering work too much. Personally, because I was a friend of Dr. Morgan's I became involved in the dispute, and I used to have to represent Dr. Morgan on the Board frequently. When he was out of town he would ask me to appear for him.

MR. WIERSEMA: So that for me personally was a very upsetting time, of course.
(Cont'd.)

DR. CRAWFORD: How were you involved in that, Mr. Wiersema?

MR. WIERSEMA: Well, I was involved with being his assistant. I was this man's assistant, so I attended the Board meeting; I tried to express his views. The other two members of the Board said, "Why, you have no authority. You're not officially recognized as Dr. Morgan's sit-in, so we won't listen to what you have to say." That was very difficult for me. Mr. Blandford was very sympathetic to me at that time and helped me a great deal. I remember one time when we were going to a budget hearing in Washington. The meeting was set for a Saturday morning with Mr. Blandford, Mr. Morgan, and myself. Dr. Morgan called me about ten o'clock that night and said, "The meeting is called off." I said, "Well, that's too bad. You have to go to Washington on Monday. Why did they call it off?" He said, "I don't know. Mr. Blandford's office just said that he wouldn't meet with me." I said, "Well, Dr. Morgan, let me straighten it out." He said, "Do what you want to do." I said, "Well, could you meet with us tomorrow morning?" He said, "Well, no, I live out at Norris, and I have a meeting out at Norris tomorrow, and I don't want to come into Knoxville."

So I got hold of Mr. Blandford late that night, and he said that it was entirely erroneous and that he would be glad to meet with Dr. Morgan at any time that Dr. Morgan wished and he would be glad to go with me in the morning out to Norris, which we did, and everything was satisfactory.

But you see how much trouble that was. That was difficult for me.

DR. CRAWFORD: Do you know how that situation happened?

MR. WIERSEMA: Those were slips in administrative procedure. Some secretary made some mistake. Nobody knows who it was or why it was. It may have been deliberate, or it may have been just a slip. But the trouble was that the atmosphere was antagonistic, so that Dr. Morgan took personally anything that happened. Instead of just calling Mr. Blandford himself, he preferred to just sit still and do nothing and call me, you see. If there had been a close personal relationship between the three directors nothing like that would ever have happened. He would have gotten right on the phone himself and straightened it out instead of having a mediator to straighten it out.

During the war was a very difficult period for TVA, because engineers were leaving us every day to go in the service. Our men were drafted in the lower ranks. We couldn't employ people. We employed many, many women during that period. In Chattanooga we had a training school for some two hundred girls. We had gotten college graduates trained in math. About seventy percent of them were able to continue in our program. About thirty percent of them were a dead loss. We just couldn't train them for that kind of work. The third period with Eisenhower had very little effect on us at all. We went through that quite smoothly.

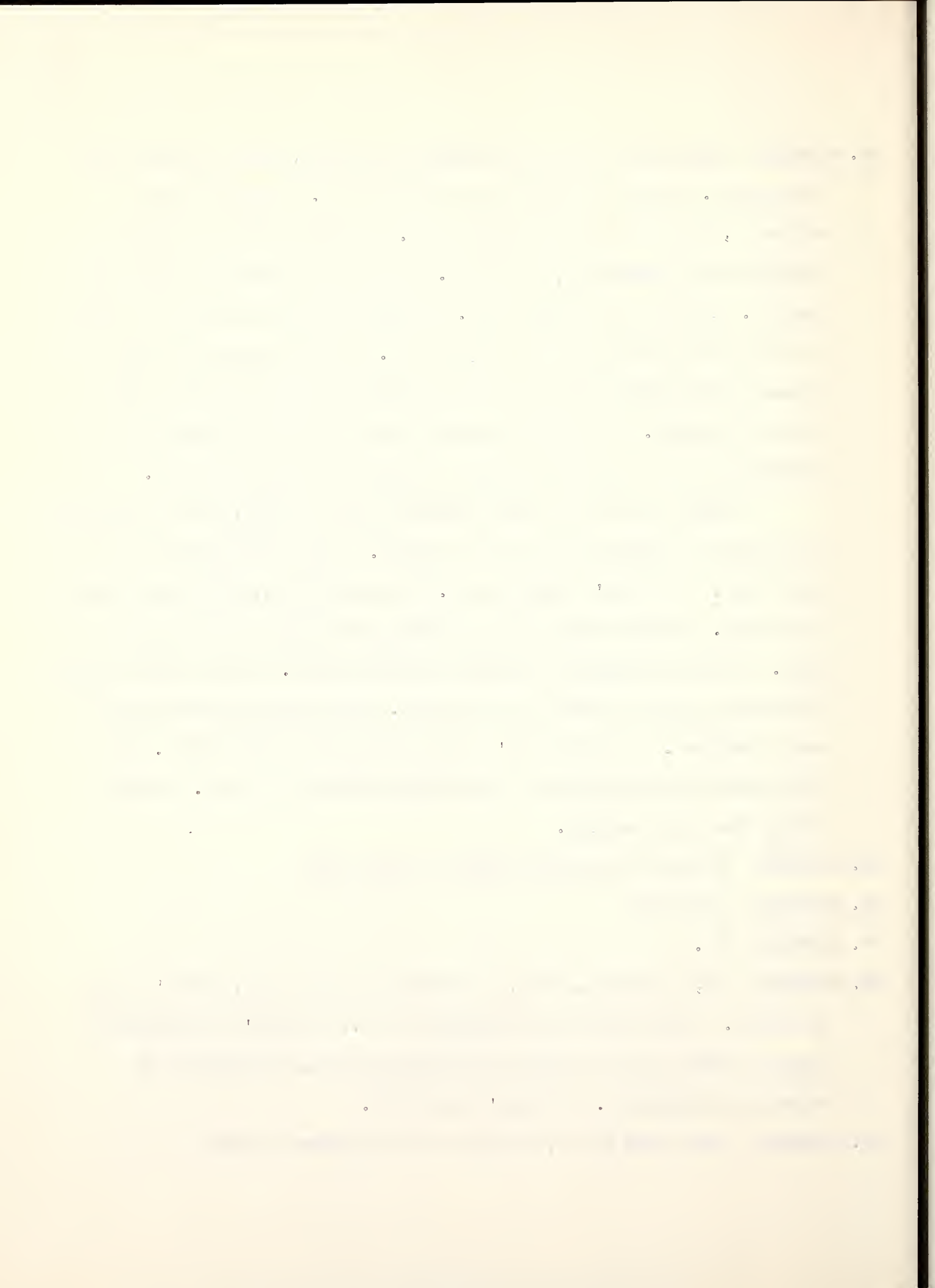
DR. CRAWFORD: Did people anticipate trouble at that time?

MR. WIERSEMA: Eisenhower?

DR. CRAWFORD: Yes.

MR. WIERSEMA: Yes, we thought, "Well, the Republicans are in now, and it's going to kill us." But nothing really happened at all. We weren't too disturbed because by that time the economy had straightened out, and there was no depression particularly. We weren't too afraid.

DR. CRAWFORD: After World War II, did many of your engineers return?



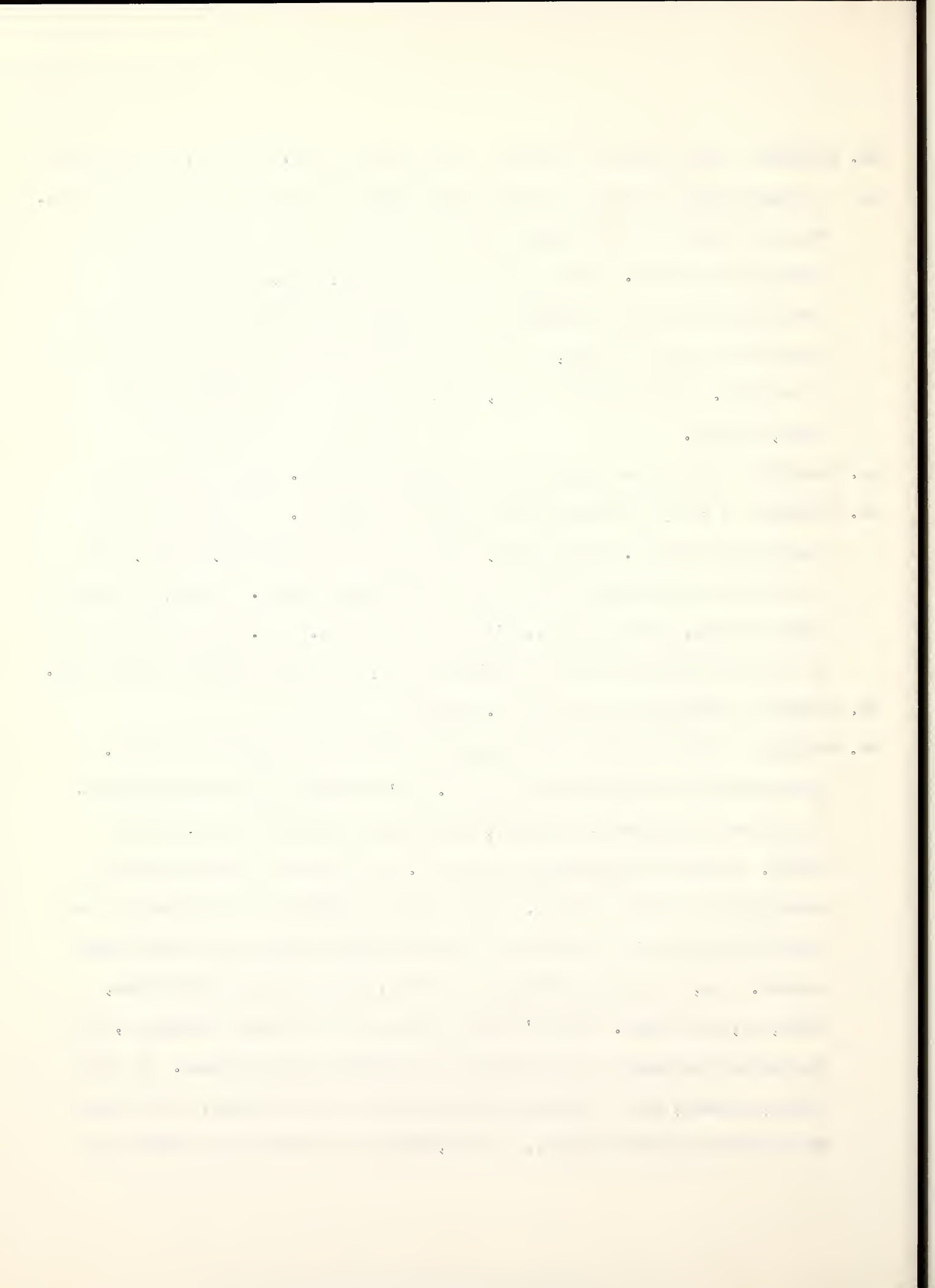
MR. WIERSEMA: Many of them did return--a great many of them. In fact, we had almost too many because we had had to fill their places as best we could during the war. Sometimes with women and sometimes with men who were not as well-educated--trained I should say. Then when the men came back, well, of course it was very difficult to let somebody go who had served you for three or four years and did the best they could, to be replaced by somebody who had been away for a long time. But we worked it out, and it was one of the difficult periods again, perhaps.

DR. CRAWFORD: Did you feel any personal difficult after Mr. Arthur Morgan left?

MR. WIERSEMA: I felt, of course, that I would be dismissed. I had no idea that they would retain me. When Colone Parker came to me and said, "Harry, will you continue to work with me?" I was really thunderstruck. I said, "Of course, Colonel Parker, if you want me, I'll be glad to stay." Dr. Morgan had offered me a job with him, but I was very glad to stay, and I was happy that I did stay.

DR. CRAWFORD: What was the job with Dr. Morgan?

MR. WIERSEMA: He had the idea that we could establish flood control insurance. The United States had none at that time. It's a very, very interesting idea. It may have been ahead of its time, but his idea was that we would study floods. He had an organization to do that. And we would determine what the actual risk of floods would be. Then he would establish insurance rates based on that risk and sell insurance all over the United States where flood hazards existed. Now, the idea lay dormant from 1937, when he made me this offer, until, oh, about 1965. Now it's being revived by the federal government, and the federal government is now instituting insurance against floods. You will notice, perhaps, that in Mississippi during this last hurricane, I just heard on the television this morning, that \$4,000 worth of hurricane insurance was



MR. WIERSEMA: settled for \$500 by the insurance company. They can settle for so (Cont'd.)

little because they say that most of the damage was caused by flood, not by win or the hurricane. So these poor people who thought they had \$4,000 worth of insurance are having to settle for a fraction of that because most of the damage was caused by floods and not by wind. How they determine how much of that was floods and how much was winds is more than anybody can say. So flood insurance is important. I think it will be just like fire insurance, which was started in the 1850's by somebody. I think that flood insurance in the years to come will be a common thing.

DR. CRAWFORD: Do you think that many of Mr. Morgan's ideas were ahead of their time?

MR. WIERSEMA: Almost all of them were ahead of their time. Many of them were far ahead of their time. For instance, he had an idea about reducing the number of counties in Tennessee from 95 to maybe 20. Well, that received instant antagonism and opposition. But as a matter of fact, some day Tennessee is going to have to reduce the number of counties. You can't continue to keep courthouses all over these 95 counties.

DR. CRAWFORD: Obviously, we don't need 95 counties.

MR. WIERSEMA: It's perfectly obvious, you see, so his ideas were way in advance of the times. All of them have been.

DR. CRAWFORD: Did he have a weakness in calculating the human factor? For example, the effect the proposal to abolish counties would have on people in the state?

MR. WIERSEMA: I think that his mind ignores that factor. He just doesn't consider it at all. He's an engineer. He thinks, "Well, is it inefficient? Let's make it efficient. Let's do something." Then without thinking about the effects at all, he just puts it into the newspaper. Of course, he gets opposition right away. But on the other hand, his ideas are always very sound scientifically.

MR. WIERSEMA: I remember hearing him making a talk in 1934 or '35, in which he (Cont'd.)

said that hydro-power is going to be superceeded, not by conventional steam, but by some other form of energy. He said, "I can't anticipate what it will be, but I predict that inside of thirty years in the Tennessee Valley, hydro-power will be of lesser importance, and this new form of energy, whatever it is, will become of extreme importance." Of course, it turned out to be nuclear energy. I'm sure he didn't have nuclear energy in his mind, but he had vision enough to see that something was going to supersede hydro-power.

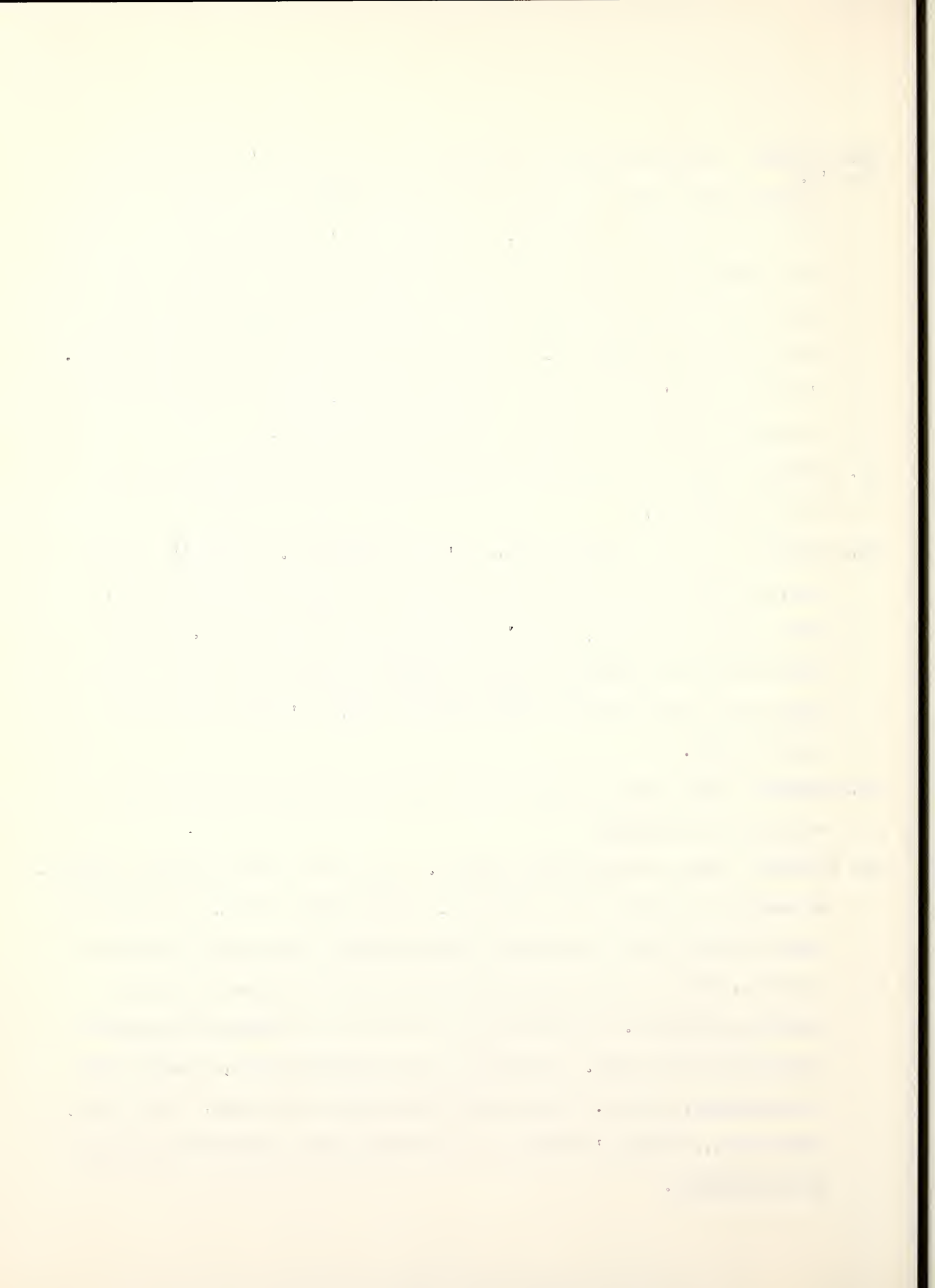
DR. CRAWFORD: Why, do you feel that he thought in this scope and on this scale?

Very few people do.

MR. WIERSEMA: He had a brilliant mind. He's a lone-thinker. He doesn't as you know, get along too well with certain kinds of people, such as Lilienthal. That is just his make-up, and he's been that way all of his life. When he would come into our office in Memphis everybody would be so excited that we would just be under nervous tension until he left. He's just that dynamic sort of person.

DR. CRAWFORD: Did it have something to do with his training, or was it simply the way that he thought?

MR. WIERSEMA: Simply the way that he thought. He had very little technical training. He never was a graduate of a university. He had fertile ideas. He would come into our Memphis office from Dayton with engineering ideas, some of which were brilliant, such as in the Miami Conservancy District but some of them were perfectly ridiculous. It would take us an hour or two to make him understand how ridiculous they were. But when he saw how foolish it was, he would give up immediately, you see. That was the kind of mind that he had. It was very, very fertile. He doesn't think of all the consequences until they are brought to his attention.



DR. CRAWFORD: But he was reasonable at looking at both sides of the question?

MR. WIERSEMA: Oh, yes, yes. If it was brought to his attention he was always reasonable.

DR. CRAWFORD: Then why was there the difficulty with the other two Board members?

MR. WIERSEMA: That was a personality clash with Mr. Lilienthal, I think.

Lilienthal was an opportunist. Let me cite one case. In the Berry marble case the engineers and the geologists reported that the marble was useless--- had no value at all. Berry, however, was a very influential person and demanded a million dollars or so for his marble. It appeared that he would settle it for a nominal sum--maybe fifty thousand or something. It probably would cost as much as that to defend it in court. Lilienthal was all for settling it out of court. Morgan said that not one cent would they give for something that is not worthwhile. Not one cent!! Well, with such a stand, you see, it was impossible for those two to get together. Their minds just worked in different ways.

DR. CRAWFORD: Mr. Morgan thought a great deal in terms of principle, didn't he?

MR. WIERSEMA: Absolutely in principle. Extremely ethical and always valued principle over and above any expediency of any kind. They said that he would spend fifth thousand dollars to retain principle when he could have settled it for much less.

DR. CRAWFORD: Did you have adequate financial backing? Do you feel that the appropriations were sufficient for all of your engineering needs?

MR. WIERSEMA: For the most part. There were times when the appropriations were cut back and it made us slow down our work, which makes it more expensive, because your overhead goes on longer. This is as it is now on Tellico Plains. The Tellico Plains project has been postponed for a couple of years; although, the dam is already finished. So there have been some instances of where slowness in appropriating has cost us money. But it hasn't affected our whole

MR. WIERSEMA: program to any great extent. We have never been short of power; we've (Cont'd.)

gotten our navigation channels completed; we got our flood control in time for its need.

DR. CRAWFORD: Have you never had to abandon any significant project that you wished to have?

MR. WIERSEMA: Only temporarily. The dams up in eastern Tennessee--the Watauga and South Holston Dams--lay idle for several years for lack of funds. Of course, the money that had been spent at that time was drawing interest and was wasted during that period. But they finally were financed and finally were completed.

DR. CRAWFORD: Do you feel that building the dams has upset the balance of nature in the region to some extent?

MR. WIERSEMA: I don't think so, myself. I have heard that said many times.

People said that it changed the atmosphere, changed the rainfall conditions.

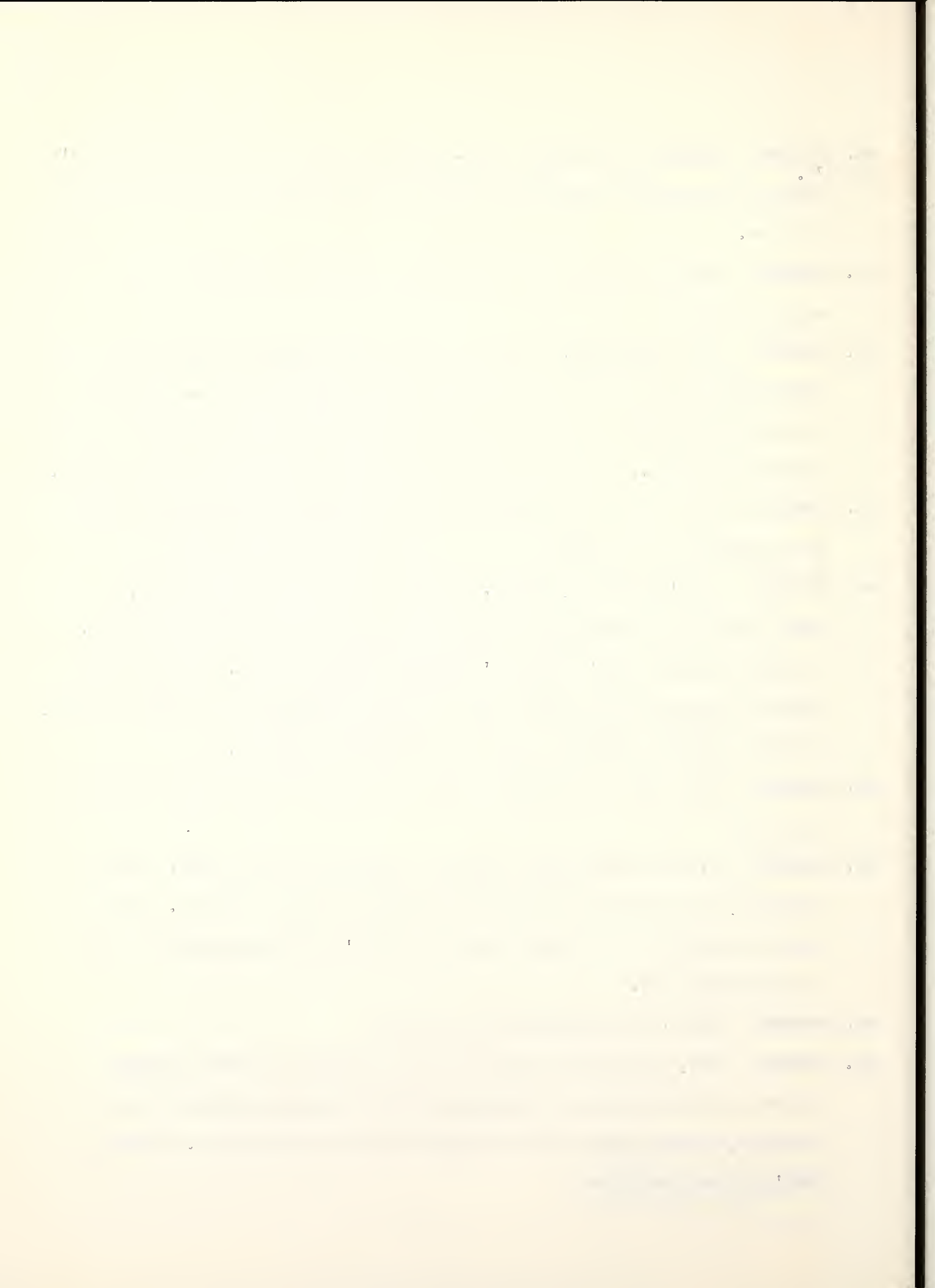
I studied it, and I don't think it's changed anything at all. I think that it improves many conditions, because we have better flow, better quality of water, so it has improved, but not changed the situation in any way.

DR. CRAWFORD: Do you have any estimate about how long the TVA dams and reservoirs will last?

MR. WIERSEMA: Oh, yes, many of them will last a thousand years or more. Norris reservoir, for instance, will last for a thousand years, I suppose. There is only one reservoir in our whole system, and that's Ocoee #3, which will last less than 100 years.

DR. CRAWFORD: Then you can calculate those factors?

MR. WIERSEMA: Well, we make that which we call an estimate. We have measured for many years the amount of sedimentation and multiply that by the space available, and that gives you the number of years it should last. Perhaps



MR. WIERSEMA: that's not extremely accurate, but still it gives a pretty good idea. (Cont'd.)

DR. CRAWFORD: Do you anticipate any danger of the dam reservoirs filling in?

MR. WIERSEMA: As I say, it will be a thousand years for most of them. By that time we will probably have an entirely different civilization--an entire different form of power. No, I think that with the exception of this one dam--Ocoee #3-- we will have no difficulty at all.

DR. CRAWFORD: Why is Ocoee #3 different?

MR. WIERSEMA: That's because of a curious situation. The town of Duck Town has a copper mining development. This development is above the dam, and for many years they mined the copper and smelted the ore by cutting down wood, forests, and using this for fuel for refining the copper, which in turn let out sulphur in the air, killing more foliage. So the whole area is denuded. So that when we built the dam there, why, the rains come and washed the soil right into the reservoir. Pretty soon the reservoir will be filled up. But we are helping the copper company to change this regime. They now don't use wood any more, of course. They use coal. They don't admit the sulphur into the air. They use it for commercial sulphur, and they find that the sale of sulphur brings them more return than the sale of copper. We also tried to replant this area which they had denuded over these many, many years. It's now coming back into agricultural use-forestry and so on--and I think that in another fifty or so years the whole situation will be improved. Then we will build another dam or do something about Ocoee #3. In the meantime, Ocoee #3 will have to fill up.

DR. CRAWFORD: Have you done much consulting for private industry, as with the copper company?

MR. WIERSEMA: No. Personally, do you mean?

DR. CRAWFORD: No, I mean for TVA. Have you helped them in their problems in the region, as you did in using the sulphur?

MR. WIERSEMA: Well, we didn't help them in that. The copper company devised that method themselves. If you mean TVA in general, we have consulted in industry, but not in that particular one. We have helped industry mostly in the location of their plants, and I think probably our chemical organization at Muscle Shoals has helped the fertilizer industry a great deal in giving them different kinds of fertilizers and formulas for fertilizers.

DR. CRAWFORD: Mr. Wiersema, to get to an early part at the last, since I failed to do so earlier, in what year were you born?

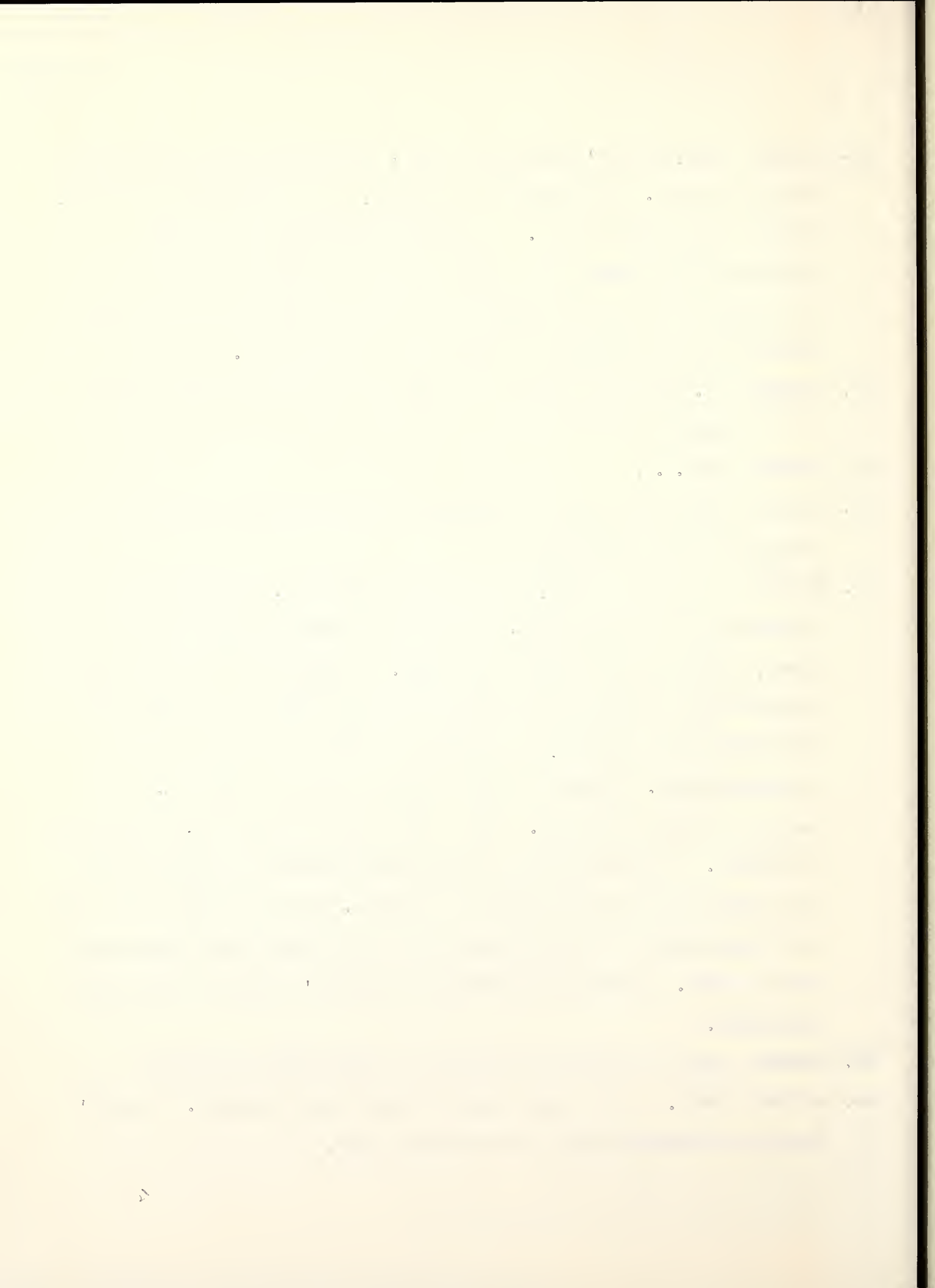
MR. WIERSEMA: Well. . .

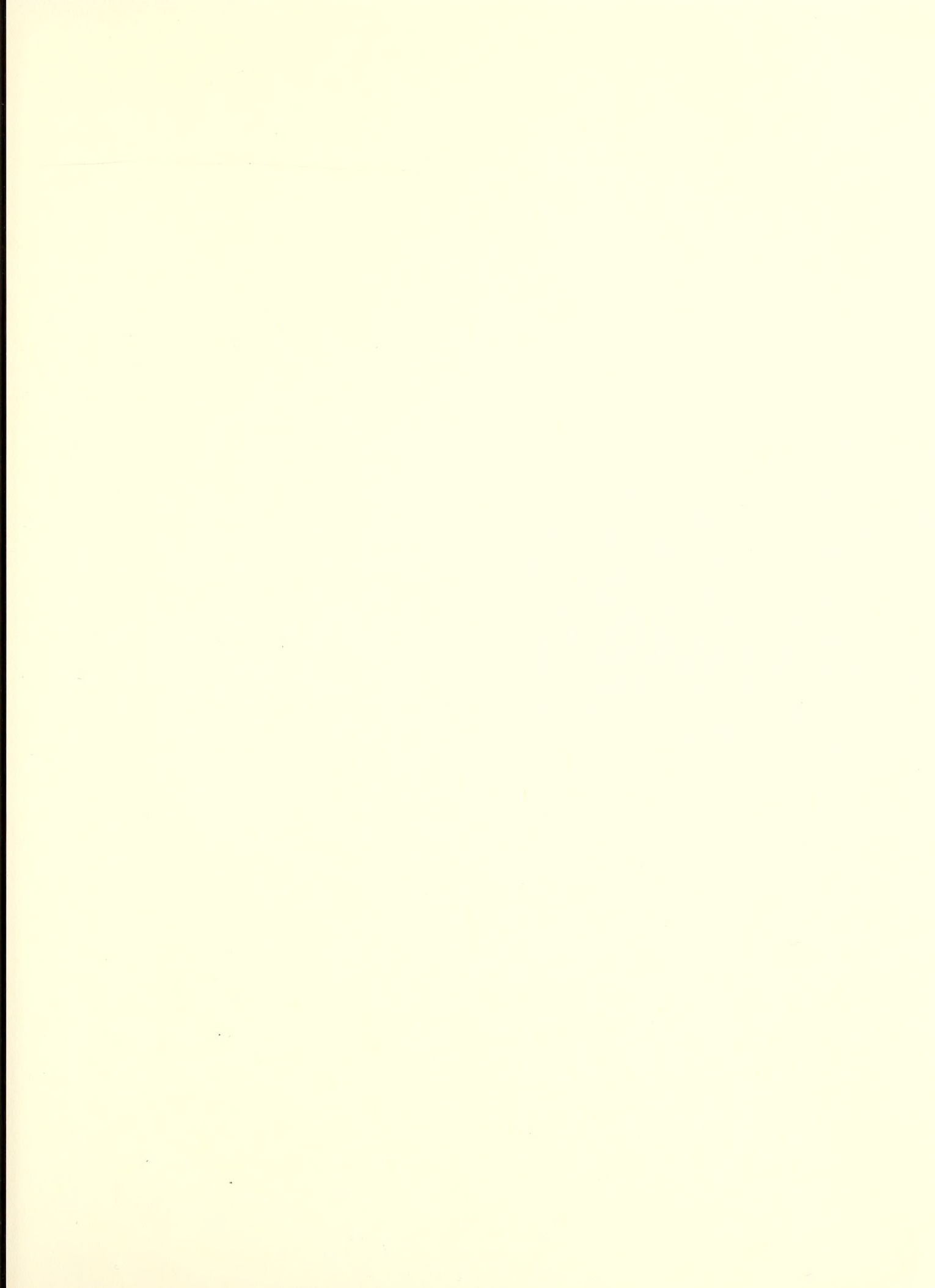
DR. CRAWFORD: And can you tell me something about your education and why you decided to go into engineering?

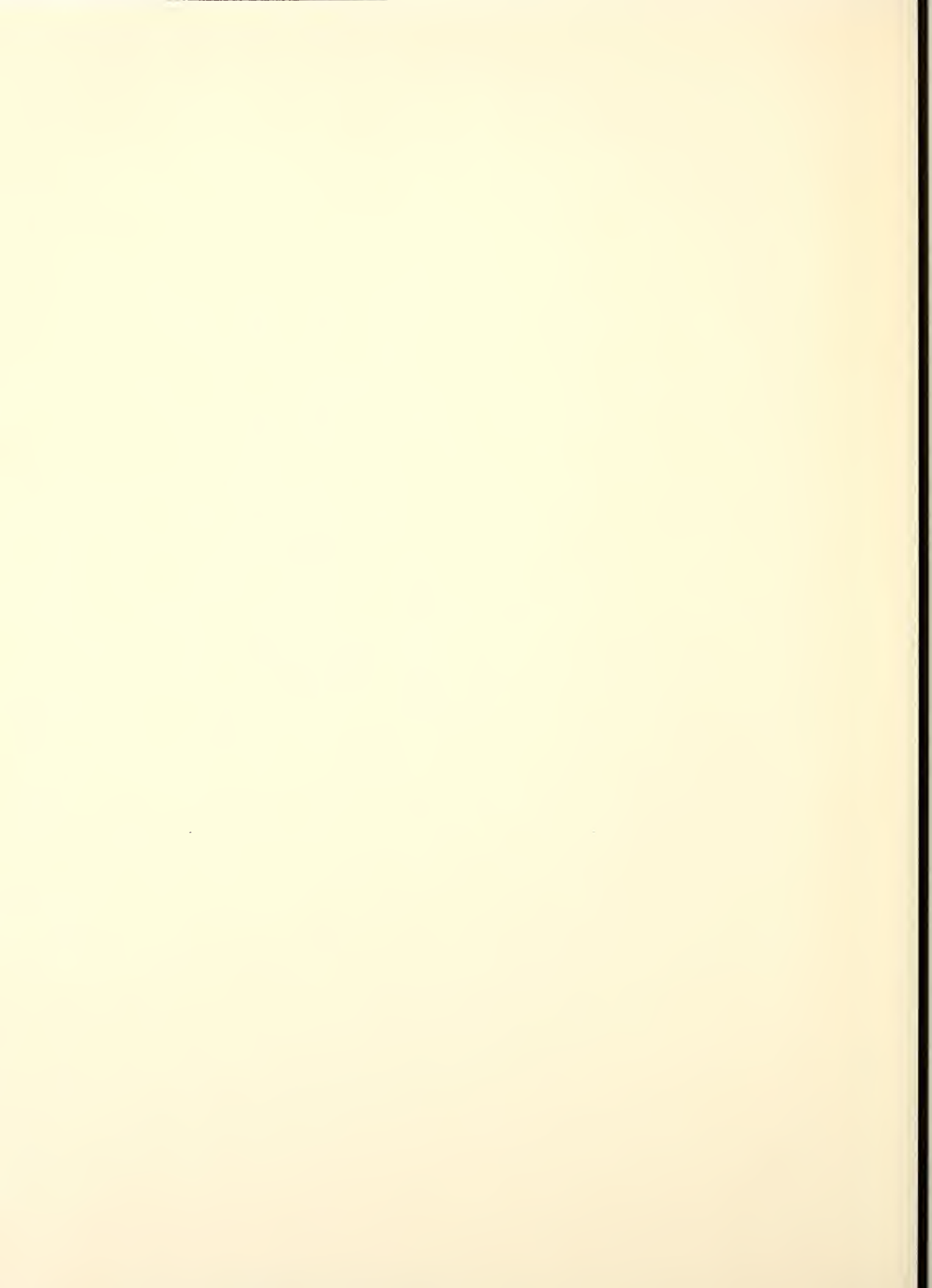
MR. WIERSEMA: I was born in 1892, in Grand Rapids, Michigan. My family moved to Chicago when I was six, in 1898. I went to the suburban school system in Berwyn, Illinois, and to Cicero High School. In high school I studied what careers might be available, and because I was very good in mathematics and liked physics and chemistry, my instructor advised me that engineering was a good profession. The more I thought about it the more I liked it. I decided to become an engineer. I got a four-year scholarship to the University of Illinois. I did enjoy all of my engineering work--both architectural and civil engineering--at the University of Illinois. When I got out I immediately got an engineering job and came back to get my professional civil engineering degree in 1919. I graduated in 1913 with a Bachelor's degree in Architectural Engineering..

DR. CRAWFORD: Have you ever wished that you had taken another profession?

MR. WIERSEMA: Never. I have always been very happy in my profession. I wouldn't change it an iota if I had it to do all over again.









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